PB-229 840

POLLUTION OF THE INTERSTATE WATERS OF THE MENOMINEE RIVER AND ITS TRIBUTARIES, CONFERENCE HELD IN MENOMINEE, MICHIGAN ON NOVEMBER 7-8, 1973

VOLUME I

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Washington, D.C.

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PB 229 840

OFFICE OF THE SOLICITOR
DIVISION OF WATER RESOURCES AND PROCUREMENT

i

CONFERENCE

in the matter of

Pollution of the Interstate Waters of the

MENOMINEE RIVER AND ITS TRIBUTARIES

VOLUME I

Menominee, Michigan
November 7-8, 1963

U.S. Department of Health, Education, and Welfare

Washington, D.C.

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Conference in the Matter of Pollution of Interstate Waters of the Menominee River and its tributaries (Michigan-Wisconsin) convened at 9:30 a.m., C.S.T., on Wednesday, November 6, 1963, in Goodfellowship Hall, Menominee, Michigan.

PRESIDING:

Mr. Murray Stein, Chief, Enforcement Branch, Water Supply and Pollution Control, Public Health Service, Department of Health, Education, and Welfare, Washington 25, D. C.

CONFEREES:

Mr. Robert S. Schneider, Department of Health, Education, and Welfare, Chicago, Illinois

Mr. Loring F. Oeming, Michigan Water Resources Commission, Lansing, Michigan

Mr. Donald M. Pierce, Michigan Department of Health, Lansing, Michigan

Mr. Irving H. Ronk, Michigan Water Resources Chairman

Mr. James H. McDermott, Assistant Attorney General, Madison, Wisconsin

Mr. O. J. Muegge, Wisconsin Committee on

CONFEREES (Continued):

Water Pollution, Madison, Wisconsin

Mr. Theodore F. Wisniewski, Wisconsin Committee on Water Pollution, Madison, Wisconsin

PARTICIPANTS:

Mr. John J. Abramson, Federal Power Commission, Chicago, Illinois

Mr. Joseph Bal, Michigan Water Resources Commission, Escanaba, Michigan

Mr. R. M. Billings, Kimberly-Clark Corporation, Neenah, Wisconsin

Mr. Carl J. Blabaum, Wisconsin State Board of Health, Madison, Wisconsin

Mr. K. P. Butterfield, United States Forest Service, Department of Agriculture, Rhinelander, Wisconsin

Mr. D. J. Dughie, Scott Paper Company, Marinette, Wisconsin

Mr. Paul H. Eschmeyer, Bureau of Commercial Fisheries, Department of the Interior, Ann Arbor, Michigan

PARTICIPANTS (Continued):

Mr. Carlos M. Fetterolf, Jr., Michigan Water Resources Commission, Lansing, Michigan

Mr. Hereford Garland, Forum on Resources of Upper Michigan, Houghton, Michigan

Mr. James Harvath, Niagara Village, Niagara, Wisconsin

Mr. Lloyd A. Lueschow, Wisconsin Committee on Water Pollution, Madison, Wisconsin

Mr. Kenneth M. Mackenthun, United States Public Health Service, Sanitary Engineering Center, Cincinnati, Ohio

Mr. William D. Marks, Michigan Water Resources Commission, Lansing, Michigan

Colonel John C. Mattina, Chicago District, Corps of Engineers, Chicago, Illinois

Mr. L. A. Montie, Wisconsin State Board of Health, Madison, Wisconsin

Mr. Nicholas V. Olds, State of Michigan, Lansing, Michigan

Mr. Ronald Pember, City of Marinette, Marinette, Wisconsin

Mr. Carl Peterson, Corps of Engineers, Kewaunee, Wisconsin

PARTICIPANTS (Continued):

Mr. Martin Ponzio, Niagara, Wisconsin

Mr. Ralph W. Purdy, Michigan Water Resources Commission, Lansing, Michigan

Mr. William Ruth, Wisconsin Federation of Conservation Clubs, Eagle River, Wisconsin

Mr. C. A. Stravinski, Wisconsin State Board of Health, Madison, Wisconsin

Mr. John E. Vogt, Michigan Department of Health, Lansing, Michigan

Mr. W. E. Raffin, Wisconsin Michigan Power Company, Iron Mountain, Michigan

Mr. Gordon C. Solberg, Jr., Michigan Water Resources Commission, Lansing, Michigan

Mr. A. W. West, United States Public Health Service, Sanitary Engineering Center, Cincinnati, Ohio

Hon. Edward A. Woleske, Marinette, Wisconsin

OTHERS IN ATTENDANCE:

Mr. C. F. Abendschein, Ansul Chemical Company, Menominee, Michigan

Mr. Thomas Angeli, A.R.A., Iron River, Michigan

Mr. Richard J. Auchter, Kimberly-Clark Corporation, Neenah, Wisconsin

Mr. Roger A. Baird, Kimberly-Clark Corporation, Neenah, Wisconsin

Mr. Robert F. Balch, The Institute of Paper Chemistry, Appleton, Wisconsin

Mr. Kent Balentine, United States Public Health Service, Sanitary Engineering Center, Cincinnati, Ohio

Mr. Harold D. Beaton, Legislative Assistant to Senator Pat McNamara, Washington, D. C.

Mr. Wendell Beaucoch, Fishing Org., Menominee, Michigan

Mr. Curtis G. Beck, Michigan Water Resources Commission, Lansing, Michigan

Mr. Milton Becker, Dickinson County Health Department, Iron Mountain, Michigan

Mr. Clifford D. Bermus, Flint, Michigan

Mr. K. E. Biglane, Department of Health, Education, and Welfare, Public Health Service, Washington, D. C.

OTHERS IN ATTENDANCE (Continued):

Mr. Hayse H. Black, United States Public Health Service, Sanitary Engineering Center, Cincinnati, Ohio

Mrs. Thelma S. Black, Visitor

Mrs. Gertrude L. Bleiler, Menominee Area Chamber of Commerce, Menominee, Michigan

Mr. Frank J. Boerner, Marinette, Wisconsin

Mr. Ward D. Brown, Menominee, Michigan

Mr. David L. Brooker, Kimberly-Clark Corporation, Appleton, Wisconsin

Mr. Bill Bryant, Institute of Paper Chemistry, Appleton, Wisconsin

Mr. Milton Burdick, Wisconsin Conservation Department, Marinette, Wisconsin

Mr. Donald M. Carmichael, University of Wisconsin, School of Law, Madison, Wisconsin

Mr. Andre L. Caron, National Council for Stream Improvement, New York, New York

Mr. Gerald Channot, City of Marinette

Mr. James P. Clancey, Michigan Mining Association, Ishpeming, Michigan

Mr. James I. Borbett, Menominee, Michigan

Mr. Cletus Courchaine, Michigan Department of Health, Escanaba, Michigan

OTHERS IN ATTENDANCE (Continued):

Mr. Ray N. Czerp, Marinette Eagle-Star, Marinette, Wisconsin

Mr. Raymond DeLaat, Badger Paper Mills, Peshtigo, Wisconsin

Mr. E. W. Delgoffe, City of Menominee, Menominee, Michigan

Mr. Kenneth O. Doyle, City of Menominee, Menominee, Michigan

Mr. Larry Ebsch, Eagle-Star, Marinette, Wisconsin

Mr. R. W. Edwards, Inland Steel Company, Iron River, Michigan

Mr. Eugene Eunis, Meno Sewage Treatment Plant, Menominee, Michigan

Mr. C. R. Faulkender, Charmin Paper Products Company, Green Bay, Wisconsin

Mr. David J. Fornetti, City of Iron Mountain, Iron Mountain, Michigan

Mr. Edward A. Forsman, Chamber of Commerce, Crystal Falls, Michigan

Mr. Joe L. Freiss, Menominee, Michigan

Mr. Joseph Frigo, Frigo Brothers Cheese Corporation, Lena, Wisconsin

OTHERS IN ATTENDANCE (Continued):

Mr. Leo G. Frigo, Carney Milk Company, Carney, Michigan

Mrs. Ken Gorey, Michigan Farm Bureau, Stephenson, Michigan

Mr. Wesley A. Grosh, United States Bureau of Mines, Minneapolis, Minnesota

Mr. Erling N. Hansen, Marinette Waterworks, Marinette, Wisconsin

Mr. Nelson F. Hartberg, Marinette Harbor Company, Marinette, Wisconsin

Mr. Edward N. Heger, Ansul Chemical Company, Menominee, Michigan

Mr. Joseph L. Heraly, Menominee, Michigan

Mr. Raymond W. Henschel, Marathon Division of American Can Company, Menominee, Michigan

Mr. Arthur Hefcher, Menominee, Michigan

Mr. J. M. Hulderby, St. Regis Paper Company, Rhinelander, Wisconsin

Mr. Ralph B. Hovind, Wisconsin Department of Resources Division, Madison, Wisconsin

Mr. Roy A. Jensen, Michigan Fisheries Producers, SEC, Escanaba, Michigan

Mr. Russell L. Johnson, Michigan Department of Health, Escanaba, Michigan

OTHERS IN ATTENDANCE (Continued):

Mr. W. H. Jollie, Baxter and Woodman, Crystal Lake, Illinois

Mr. Steve J. Kakuk, Stephenson Townsby, Stephenson, Michigan

Mr. Lewis N. Kirchner, Alderman, Menominee, Michigan

Mr. F. W. Kittrell, United States Public Health Service, Sanitary Engineering Center, Cincinnati, Ohio

Mr. F. Kraft, Appleton, Wisconsin

Mr. Marcus C. Kronauer, Menominee Township, Menominee, Michigan

Mr. Charles Kruzich, City of Caspian, Caspian, Michigan

Mr. Kurt Kuehlthau, Hanna Mining Company, Iron River, Michigan

Mr. Peter G. Kuh, Public Health Service, Department of Health, Education, and Welfare, Washington, D. C.

Mr. Verl P. Kuhnlein, K & C Plbz and Htz Company, Menominee, Michigan

Mr. Duaine J. Kulibet, United States Coast Guard, Menominee, Michigan

Mr. J. C. Kurtyka, Wisconsin Michigan Power Company, Appleton, Wisconsin

OTHERS IN ATTENDANCE (Continued):

Mr. Mort Lebow, Department of Health, Education, and Welfare, Washington, D. C.

Mr. Howard N. Lehner, Scott Paper Company, Oconto Falls, Wisconsin

Mrs. N. L. Lindquist, Escanaba League of Women Voters, Escanaba, Michigan

Mr. James L. Lissack, Wisconsin State Board of Health, Green Bay, Wisconsin

Mr. Bernard F. Lueck, Sulphate Pulp Manufacturers' Research League, Appleton, Wisconsin

Mr. R. J. Lynch, Milwaukee Jounral, Milwaukee, Wisconsin

Mr. Ralph E. Magnuson, Jr., The Cleveland-Cliffs Iron Company, Ishpeming, Michigan

Dr. Charles W. Mangun, Jr., Public Health Service, Chicago, Illinois

Mr. A. H. Maedke, Pauly Cheese Company, Green Bay, Wisconsin

Mr. Clarence Macke, Sewage Plant Operator, Menominee, Michigan

Mr. Emmet McCarthy, City of Marinette, Marinette, Wisconsin

OTHERS IN ATTENDANCE (Continued):

Mr. James O. McDonald, Public Health Service, Department of Health, Education, and Welfare, Water Supply and Pollution Control, Region V, Chicago, Illinois

Mr. L. F. McDonnell, Scott Paper Company, Marinette, Wisconsin

Mr. Rudolph Mesnak, Pauly Cheese Company, Green Bay, Wisconsin

Mr. Robert M. Murphy, Herald Leader, Menominee, Michigan

Mr. Robert H. Myers, Bureau of Outdoor Recreation, Ann Arbor, Michigan

Mr. W. R. Nelson, Green Bay Packaging, Green Bay, Wisconsin

Mr. Edward Norler, Menominee, Michigan

Mr. Walter Nowack, Nowack Real Estate, Menominee, Michigan

Mr. Arthur A. Oehmcke, Wisconsin Conservation Department, Woodruff, Wisconsin

Mr. Thomas W. Orr, Marathon Division of American Can Company, Menominee, Michigan

Mr. Ray Pagel, Press-Gazette, Green Bay, Wisconsin

OTHERS IN ATTENDANCE (Continued):

Mr. Philip D. Pearson, Inland Steel Company, Ishpeming, Michigan

Mr. John Penttila, Crystal Falls Township, Crystal Falls, Michigan

Mrs. Rheta B. Piere, Department of Health, Education, and Welfare, Washington, D. C.

Mr. Arthur Pope, Retired, Ansul Chemical Company, Marinette, Wisconsin

Mr. Harry O. Poulsen, Wallace, Michigan

Mr. John M. Rademacher, Public Health Service, Water Supply and Pollution Control, Region V, Chicago, Illinois

Mr. Edward Raygo, City of Menominee, Menominee, Michigan

Mr. Ralph E. Remeschatis, A&P Tea Company, White House Milk Division, Manitowoc, Wisconson

Mr. John W. Reindl, Mayor, City of Menominee, Menominee, Michigan

Mr. Clement Ritler, Nadeau Township, Carney, Michigan

Mr. Barry E. Rohan, Milwaukee Sentinel, Milwaukee, Wisconsin

Mrs. Wm. Ruth, Wisconsin Fed. Cons. Club, Eagle River, Wisconsin

OTHERS IN ATTENDANCE (Continued):

Mr. C. W. Rye, Ingallston Township, Wallace, Michigan

Mr. James N. Schenck, Lieutenant, United States Coast Guard, Milwaukee, Wisconsin

Mr. R. C. Schnall, Public Health Service, Department of Health, Education, and Welfare, Water Supply and Pollution Control, Chicago, Illinois

Mr. F. H. Schraufnagel, Wisconsin Commission on Water Pollution, Madison, Wisconsin

Mr. R. C. Shaw, Mucc & Delta County Sportsmen's Club, Escanaba, Michigan

Mr. Frank J. Shepich, City of Stambaugh, Stambaugh, Michigan

Mr. Roger J. Smithe, Packaging Corporation of America, Manistee, Michigan

Mr. Abram P. Snyder, U.P.C.A.P., A&O, M.S.U., Marquette, Michigan

Mr. James A. Spies, Spies Company, Menominee, Michigan

Mr. Bruce Stevens, Wisconsin State Board of Health, Green Bay, Wisconsin

Mr. Frank Stevens, Wausauke, Wisconsin

OTHERS IN ATTENDANCE (Continued):

Mr. Anthony V. Stupping, Menominee Filtration Plant, Menominee, Michigan

Mr. Vic Swanson, Marathon Division of American Can Company, Menominee, Michigan

Mr. Stephen C. Sweeney, Delta Menominee Health Department, Menominee, Michigan

Mr. Marsdon J. Tatro, Wallace, Michigan

Mrs. D. V. Tatro, Wallace, Michigan

Mrs. William E. Taylor, League of Women Voters, Escanaba, Michigan

Mr. R. V. Thoms, Kimberly-Clark Corporation, Niagara, Wisconsin

Mr. Paul J. Trione, City of Norway, Norway, Wisconsin

Mr. T. L. Vander Velde, Michigan Department of Health, Lansing, Michigan

Mr. A. VanVlissingen, Pulp and Paper Information Service, Appleton, Wisconsin

Mr. Henry L. Wagner, City of Kingsford, Kingsford, Michigan

Mr. Andrew Waitrovich, Village of Niagara, Niagara, Wisconsin

Mrs. Andrew Waitrovich, Niagara Women's Club, Niagara, Wisconsin

OTHERS IN ATTENDANCE (Continued):

Mr. Florin Warren, Michigan Department of Conservation, Crystal Falls, Michigan

Mrs. Florin Warren, Crystal Falls, Michigan

Mr. R. J. Wells, Kimberly-Clark Corporation, Niagara, Wisconsin

Mr. Averill J. Wiley, Sulphite Pulp Manufacturers' Research League, Appleton, Wisconsin

Mr. Joseph J. Winkel, Citizen, Menominee, Michigan

Mr. John Wormwood, Michigan Department of Conservation, Menominee, Michigan

Jean Worth, Editor, Escanaba Daily Press, Escanaba, Michigan

Mr. Clarence E. Young, City of Menominee, Board of Public Works, Menominee, Michigan

* * *

PROCEEDINGS

OPENING STATEMENT

BY

MR. MURRAY STEIN

MR. STEIN: The conference is open.

This conference in the matter of pollution of the interstate waters of the Menominee River and its tributaries, involving the States of Michigan and Wisconsin and the Department of Health, Education, and Welfare, is being held under the provisions of Section 8 of the Federal Water Pollution Control Act.

Under the provisions of that Act, the Secretary of Health, Education, and Welfare is required to call a conference of this type, when on the basis of reports, surveys and studies he has reason to believe that pollution of interstate waters subject to abatement under the Federal Act is occurring.

The purpose of the conference is to bring together the State water pollution control agencies, the representatives of the Department of Health, Education, and Welfare, and other interested parties to review the existing situation, the progress which has been made, and to lay a basis for future action by all parties concerned, and to give the States, localities, and industries an opportunity to take any remedial action which may be indicated under State and local law.

The conference technique is rather an old one. It is used by many State agencies informally in the normal conduct of their business in the field of water pollution control. The concept of the conference was proposed by the United States Supreme Court as long ago as 1921 in the famous case of New York against New Jersey involving interstate pollution. I would like to quote from this Court opinion:

> "We cannot withhold the suggestion, inspired by the consideration of this case, that the grave problem of sewage disposal presented by the large and growing population living on the shores of New York Bay is one more readily to be most wisely solved by cooperative study and by conference and mutual concession on the part of representatives of the States so vitally interested in it than by proceedings in any court however constituted."

We strongly support the conference technique and we measure our success by the situations which are solved at the conference stages, rather than by the court actions we bring.

Under Section 8 of the Federal Water Pollution Control Act, the Secretary of Health, Education, and Welfare has notified the official State water pollution control agencies of this conference. These agencies are the Michigan Water Resources Commission and the Wisconsin State Committee on Water Pollution.

Michigan will be represented by Mr. Irving Ronk, Chairman-Elect; Mr. Loring F. Oeming, Executive Secretary; and Mr. Donald M. Pierce, all of the Water Resources Commission. The State of Wisconsin will be represented by Mr. O. J. Muegge, State Sanitary Engineer, State Board of Health, Chairman, Committee on Water Pollution; Mr. Theodore F. Wisniewski, Director, Committee on Water Pollution;and Mr. James H. McDermott, Assistant Attorney General, Council for Committee on Water Pollution.

Mr. Robert J. Schneider, Department of Health, Education, and Welfare, with headquarters in Chicago, Illinois, has been designated as conferee for the Federal Government.

My name is Murray Stein. I am from Washington, D. C., headquarters of the Department of Health, Education, and Welfare.

The representatives of the official agencies are privileged to bring whomever they wish to the conference and have them participate in the conference. However, this is a conference between the State representatives and the representatives of the Department of Health, Education, and Welfare, and these parties constitute the conferees.

Both the States and the Federal Government have responsibilities in dealing with interstate water pollution control problems. The Federal Water Pollution Control Act declares that the States have primary rights and responsibilities for taking action to abate and control interstate pollution. It has always been the policy of the Department of Health, Education, and Welfare to give full recognition to this traditional role of the States. The function of the Department is to encourage the States in these activities. However, the Department of Health, Education, and Welfare is charged by law with specific responsibilities in connection with interstate pollution control problems.

The Federal Water Pollution Control Act provides that pollution of interstate waters, whether the matter causing or contributing to such pollution is discharged directly into such waters or reaches such waters after discharge into a tributary of such waters, which endangers the health or welfare of persons in a State other than that in which the discharges originate, is subject to abatement. The conference will be useful, we hope, in providing a clear picture of the problem, in delineating the progress which has already been accomplished, and in indicating what still needs to be done to correct the problem in these interstate waters.

Under the Federal law the Secretary is required at the conclusion of the conference to prepare a summary of it which will be sent to all the conferees. The summary, according to law, must include the following:

1. Occurrence of pollution of interstate waters subject to abatement under the Federal Act;

2. Adequacy of measures taken toward abatement of the pollution; and

3. Nature of delays, if any, being encountered in abating the pollution.

Subsequent to the holding of a conference, the Secretary of Health, Education, and Welfare is required to make recommendations for remedial action if such recommendations are indicated.

Now, a word about the procedure governing the conduct of the conference. A record and verbatim transcript the health or welfare of persons in a State other than that in which the discharges originate, is subject to abatement. The conference will be useful, we hope, in providing a clear picture of the problem, in delineating the progress which has already been accomplished, and in indicating what still needs to be done to correct the problem in these interstate waters.

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3. Nature of delays, if any, being encountered in abating the pollution.

Subsequent to the holding of a conference, the Secretary of Health, Education, and Welfare is required to make recommendations for remedial action if such recommendations are indicated.

Now, a word about the procedure governing the conduct of the conference. A record and verbatim transcript will be made of the conference by Mr. Al Zimmer. Mr. Zimmer is making this transcript report for the purpose of aiding us in preparing a summary, and also providing a complete record of what is said and done here. We will make copies of the summary and transcript available to the official water pollution control agencies of Michigan and Wisconsin. We have found that generally for the purpose of maintaining relationships within a Region and a State that the people who wish transcripts should request them through their State agency, rather than to come directly to the Federal Government. The reason for this is that we would prefer the people who are interested in the problem to follow their normal relations in dealing with State agencies rather than the Federal Government on these matters when the conference has been concluded. This has worked successfully in the past and we will be most happy to make this material available to the States for distribution.

All the conferees will be called upon to make statements. The conferees, in addition, may call upon participants whom they have invited to the conference to make statements. At the conclusion of such statements, the conferees will be given an opportunity to comment or ask questions, and at the conclusion of the conferees' comments or questions I may ask a question too. This procedure has proven effective in the past in developing a clear statement of the problem and in reaching agreements on equitable solutions.

At the end of all the statements, we will have a discussion among the conferees and try to arrive at a basis of agreement on the facts of the situation. Then we will attempt to summarize the conference orally giving the conferees, of course, the right to amend or suggest modifications of the summary.

I would suggest that all speakers and participants other than the conferees making statements will come to the lectern and identify themselves for purposes of the record.

Before we proceed with the statement of the Department of Health, Education, and Welfare, I would like to call on an old friend and colleague, Mr. Nicholas Olds, Assistant Attorney General of the State of Michigan, who has a statement.

Mr. Olds.

STATEMENT OF NICHOLAS V. OLDS, ASSISTANT ATTORNEY GENERAL OF THE STATE OF MICHIGAN

MR. OLDS: This is a statement that I want to read into the record on behalf of the State of Michigan from the Attorney General's office of the State:

"November 5, 1963

"The Honorable Anthony Celebrezze
Secretary
Department of Health, Education and Welfare
Washington, D. C.

In Re: Enforcement Proceedings Initiated by the Secretary of Health, Education and Welfare Under Section 8 of the Federal Water Pollution Control Act Concerning Pollution of the Menominee River, Boundary Waters Between Michigan and Wisconsin

"Dear Mr. Secretary:

"On August 9, 1963 Mr. L. F. Oeming, executive secretary of the Michigan Water Resources Commission, received a notice from you dated August 7, 1963, advising, among other things, as follows:

"'On the basis of reports, surveys and

"'studies in accordance with Section 8 of the Federal Water Pollution Control Act (33 USC 466 et seq.) I hereby call a conference in the matter of pollution of the Menominee River and its tributaries (Wisconsin-Michigan).'

"Based upon information supplied us by the Michigan Water Resources Commission, there seem to be possible questions of jurisdiction which may be raised. We wish to reserve the right to raise such questions at a later time if it appears appropriate to do so.

"Consequently we wish to request the representative of the Secretary of Health, Education and Welfare conducting these proceedings to grant us permission to make this reservation.

"Sincerely,
FRANK J. KELLEY
ATTORNEY GENERAL
BY: Nicholas V. Olds
Assistant Attorney General"

In connection with this , Mr. Oeming has a group of an exchange of letters between the Michigan Water Resources

Commission and the Secretary, which I think should be made a part of the record at this time.

MR. STEIN: The exchange of letters will be accepted in the record.

Will you give those to the reporter and, without objection, you certainly can make the reservation.

We have had our Office of General Counsel also review this jurisdictional question raised by Mr. Olds, and at this point I would like to have introduced in the record the opinion of the Office of the General Counsel.

For the information, though, of both Wisconsin and Michigan, I would suggest that I might want to give a copy of this to Mr. Olds and Mr. McDermott. I think this is possibly just a jurisdictional point of interest to us lawyers, but we would be happy to read it. If not, we would like to give you a copy.

MR. OEMING: Mr. Chairman, would you like me to identify the exhibit?

MR. STEIN: Yes, if you would.

By the way, I should say that this is an opinion of the Office of the General Counsel that I am giving to the representatives of Wisconsin and Michigan, dated October 31, 1961.

The opinion is written to me and signed by Mr.

Sidney Edelman, Chief of the Environmental Health Branch of the Public Health Division of the Office of General Counsel, entitled, "Water pollution control enforcement -- Conference called at initiative of Secretary -- Request for copies of material upon which Secretary's action was based."

MR. OLDS: The date is 1963.

MR. STEIN: I'm sorry. Thank you very much. Mr. Oeming?

MR. OEMING: Mr Chairman, the exhibit which you have accepted is a series of letters addressed to the Secretary of Health, Education, and Welfare, and which I have received from the Secretary of Health, Education, and Welfare's office.

Part A of the exhibit is a letter dated August 7, 1963, addressed to Loring F. Oeming, Executive Secretary of the Water Resources Commission, from Secretary Celebrezze.

(The letter referred to is as follows:

"THE SECRETARY OF HEALTH, EDUCATION, AND
WELFARE, WASHINGTON

August 7, 1963

"Dear Mr. Oeming:

"On the basis of reports, surveys and studies in accordance with section 8 of the Federal Water Pollution Control Act (33 U.S.C. 466 et "seq.) I hereby call a conference in the matter of pollution of the Menominee River and its tributaries (Wisconsin-Michigan). The conference will be held on Wednesday, November 6, 1963 at 9:30 a.m., CST, at the Hotel Menominee, Menominee, Michigan. Mr. Murray Stein of the Department of Health, Education, and Welfare has been designated as Chairman of the Conference.

"A complete copy of the technical presentation to be made at the conference by a representative of this Department will be supplied in ample time before the conference to permit analysis and evaluation.

"Participation in the conference will be limited to representatives of the U. S. Department of Health, Education, and Welfare and such persons as are designated by your Commission and the Wisconsin Committee on Water Pollution. You may bring such persons as you wish to the conference.

"The conference will cover all interstate problems of the Menominee River and its tributaries. As specified in the Act we will furnish a summary of conference discussions to your Commission and to the Wisconsin Committee on Water Pollution.

Sincerely,

"/s/ Anthony J. Celebrezze
Secretary

"Mr. Loring F. Oeming
Executive Secretary
Water Resources Commission
Station 'B'
Reniger Building
200 Mill Street
Lansing 13, Michigan.")

* * *

MR. OEMING: The second, Part B, is a letter dated September 3, 1963, addressed to Anthony J. Celebrezze, Secretary, Department of Health, Education, and Welfare, and signed by Loring F. Oeming, Executive Secretary.

(The letter referred to is as follows:

"September 3, 1963

"Mr. Anthony J. Celebrezze, Secretary
Department of Health, Education, and Welfare
Washington, D. C.

"Dear Mr. Celebrezze:

"The Water Resources Commission at its meeti on August 29 discussed your letter of August 7 on the subject of the conference you have scheduled on pollution of the Interstate waters of the Menominee River (Wisconsin-Michigan). The "following action was taken with reference to state participation in this conference.

> "'Motion was made by Mr. Liddle supported by Mr. Eddy, and unanimously carried, that Chairman-elect, Irving Renk and Executive Secretary, Loring F. Oeming, be designated as Michigan's conferees, with Commission member, Jim S. Gilmore, Jr., to be designated as the third conferee, if it is possible for him to attend the conference.'

"I have been informed by Mr. Gilmore that he will be able to serve in this capacity.

"The Commission members also expressed a strong desire in knowing what prompted the calling of this conference. No complaints against Wisconsin discharges of wastes to the river have been made to our knowledge, by any official agency in Michigan, nor as far as we can ascertain, have any Wisconsin officials complained about any discharges from Michigan.

"We know of no pollution contributed to these waters by Michigan which 'Is endangering the health or welfare of persons' in Wisconsin in contravention of the Federal Water Pollution Control Act. We are aware of the pollution "abatement program of the Wisconsin Committee on Water Pollution in the Wisconsin portion of the river basin and we are satisfied that appropriate measures are being taken to protect Michigan's interests in these waters.

"No reports, surveys or studies have come to our attention upon which you have relied in invoking the third option in Section 8(c)(1) providing that the Secretary act on his own initiative in calling the conference. We are most anxious to know upon what reports or other documents your action has been predicated.

"Our request for this information is dictated in large measure by the state's desire to make a constructive contribution to the conference. Without it the state is placed at a distinct disadvantage in preparing data and reports that will be helpful to the conferees in arriving at their recommendations.

"Very truly yours,
Loring F. Oeming
Executive Secretary

LFO:S

cc- Governor George W. Romney
Senator Patrick McNamara

"Senator Philip A. Hart
Representative John B. Bennett
Representative Victor A. Knox")

* * *

MR. OEMING: Part C is a copy of a letter addressed to Loring F. Oeming, dated September 23, 1963, signed by James M. Quigley.

(The letter referred to is as follows:

"DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
WASHINGTON

Office of the Secretary September 23, 1963

"Dear Mr. Oeming:

"Secretary Celebrezze has asked me to reply to your recent letter to him concerning the upcoming conference on pollution of the interstate waters of the Menominee River, Wisconsin, Michigan.

"As in the past, we welcome the full participation by representatives of your Commission in the conference. The contributions made by your Commission members and technical staff have proved invaluable in developing an accurate analysis of water quality and evaluations of corrective programs.

"It is my understanding that a complete report "of this Department's statement will be available this week. Arrangements have been made to send a copy to you within the next few days. We are looking forward to your contributions at the conference which I am sure will be most helpful and constructive.

"Sincerely,

/s/ James M. Quigley

"Mr. Loring F. Oeming
Executive Secretary
State of Michigan Water Resources Commission
200 Mill Street
Lansing 13, Michigan.")

* * *

MR. OEMING: Part D is a letter dated September 23, 1963, addressed to Honorable Philip A. Hart, United States Senate, by Murray Stein, Chief, Enforcement Branch, Division of Water Supply and Pollution Control, Department of Health, Education, and Welfare.

(The letter referred to is as follows:

"DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE WASHINGTON, D. C.
Bureau of State Services September 23, 1963

"Honorable Philip A. Hart
United States Senate

"Washington 25, D. C.

"Dear Senator Hart:

"This is in reply to your request of September 12, 1963 for information requested by Mr. Loring F. Oeming, Executive Secretary, Michigan Water Resources Commission, in regard to the notice of conference on the Menominee River (Wisconsin-Michigan) interstate pollution situation. Mr. Oeming's letter to you of September 3, 1963 and the accompanying copy of his letter of the same date to Secretary Celebrezze, enclosed with your communication, are returned herewith.

"The Secretary's findings of the occurrence of interstate pollution of the Menominee River, which he has reason to believe is endangering the health or welfare of persons in a State other than that in which it originates, is the basis for the issuance of his notice calling the conference as required by the provisions of section 8(c)(1) of the Federal Water Pollution Control Act, as amended. This consideration is indicated in the notice issued by the Secretary.

"The pollution problems we expect to cover at the conference are the effects of discharges "of industrial and municipal wastes as evidenced by pathogenic organisms, appearance, sludge deposits, growth of bacterial slimes, and oxygen depletion. It is expected, additionally, that the conferees will consider interferences, if any, with water use for recreation and boating purposes, fish and aquatic life habitat, and municipal water supply.

"The Secretary's notice states that copies of our technical presentation to be submitted at the conference will be made available in advance to the conferees in ample time for their evaluation. This statement is now in preparation and is expected to be ready about a month before the conference. It will be supplied to Mr. Oeming and the other conferees promptly upon completion.

"Sincerely yours,
/s/ Murray Stein
Chief, Enforcement Branch
Division of Water Supply and
Pollution Control.")

Enclosures

* * *

MR. OEMING: Part E is a letter dated October 8, 1963, addressed to Anthony J. Celebrezze, Secretary, Department of Health, Education, and Welfare, signed by Irving H. Ronk, Chairman, Michigan Water Resources Commission.

(The letter referred to is as follows:

"STATE OF MICHIGAN WATER RESOURCES COMMISSION
GEORGE W. ROMNEY, GOVERNOR
STAFF OFFICES 200 Mill Street
Tel. 373-3560
STATION B
Lansing, Michigan 48913

October 8, 1963

"Mr Anthony J. Celebrezze, Secretary
Department of Health, Education, and Welfare
Washington, D. C.

"Dear Mr Celebrezze:

"Subsequent to Mr. Oeming's inquiry of you under date of September 3, 1963, as to the basis for calling the Menominee River Conference, two communications have been received bearing upon this matter: a letter from Mr. Quigley to Mr. Oeming dated September 23, 1963, and a letter from Mr. Murray Stein to Senator Hart dated September 23, 1963, which the Senator forwarded to us. Copies of both are enclosed.

"We deeply regret that we are unable to find "these communications in any measure responsive to the question asked -- upon what reports or other documents has your action been predicated -- and our efforts to develop a constructive contribution to the conference have accordingly been handicapped.

"An advance copy of the Report on Pollution of the Interstate Waters of the Menominee and Brule River - Michigan-Wisconsin, received last week is similarly silent on documentary material available prior to the date of the conference call and focuses quite exclusively upon information collected by the U.S. Public Health Service subsequent to that date. We accordingly continue at loss as to the proper direction for constructive effort, unless we are to conclude that this very recently secured material will of itself constitute the substance of the Federal presentation.

"We fully recognize the authority of your Department under the law to call a conference whenever upon the basis of reports, surveys, or studies you have reason to believe that any pollution referred to in subsection (a) of the statute and endangering the health or welfare of persons in a State other than that in which the discharge "or discharges originate is occurring.

"So far, however, your office has failed to honor our request that we be apprised as to the identity of such requisite foundation material. We are accordingly faced with a choice of two equally unacceptable conclusions: either that such material is non-existent or that the Department is unwilling to make it available to this Commission as an agency of the State of Michigan. If there is yet another possible conclusion we would be grateful to learn of it.

"This letter is going out as the result of concurrence among the Commission members as to their attitude on this matter.

"Very truly yours,

/s/ Irving H. Ronk, Chairman

NB:S Michigan Water Resources Commission.")

* * *

MR. OEMING: Part F is a letter dated October 17, 1963, addressed to Irving H. Ronk, Chairman, Michigan Water Resources Commission, and signed by James M. Quigley, Assistant Secretary, Department of Health, Education, and Welfare.

(The letter referred to is as follows:

"DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

WASHINGTON

October 17, 1963

OFFICE OF THE SECRETARY

"Dear Mr. Ronk:

"Secretary Celebrezze is away from the office this week on official business. Prior to his departure he asked me to respond to your letter of October 8th.

"In answer to the question you raised as to the 'reports, surveys, or studies' which led to the calling of the upcoming conference on water pollution problems of the Menominee River, may I state that our Department receives numerous reports concerning pollution. These reports come from various sources -- conservationists, Members of Congress, or concerned citizens. Very often, as I am sure you can appreciate, these are most informal. Often they will have to do with waters where Federal jurisdiction is not applicable. While these reports may alert us to the existence of possible pollution problems seldom do they afford us with all the detailed information we would like to have. In addition, as you are aware, our Department has for a number of years "endeavored to keep under surveillance some 90 or more interstate rivers throughout the country.

"While the accumulated evidence thus obtained is often persuasive enough to cause the Secretary to schedule an enforcement conference, as it was in the case of the Menominee, you can appreciate that because of the informal and sometimes incomplete nature of many of the reports and the possibility of stale data in our surveillance surveys, when a conference is scheduled it is the procedure of our Department to make a thorough survey of the rivers involved to determine the current pollution situation. Such a survey has been made in the case of the Menominee and the Brule Rivers and an advanced copy of this report has, as your letter of October 8th indicates, been furnished to you.

"For purposes of planning your constructive participation in the forthcoming conference this report is the basic document. This report is our departmental evaluation of present pollution problems of the interstate waters of the Menominee and Brule Rivers. At the time of the conference we would appreciate any and all evidence that your Commission or other appropriate state "agencies might wish to present as to the accuracy or inaccuracy of this departmental report as to the present state of the Rivers involved.

"You can be assured that no one will be called upon to comment upon or explain any stale or informal charges as to what the state of the Menominee River was in the spring of 1963 or the summer of 1962, etc., etc. The purpose of the conference is to focus attention on the present condition of the Menominee and Brule Rivers. The state of the Rivers a year ago or five years ago is of importance only insofar as such prior condition might shed light on how the quality of the water in the Rivers is deteriorating or improving. The present quality of the water and what is being done and what more can be done to improve it is the relevant issue to be considered and determined by the conferees.

"Sincerely,

/s/ James M. Quigley
Assistant Secretary

"Mr. Irving H. Ronk
Chairman
Michigan Water Resources Commission
200 Mill Street, Station B

"Lansing, Michigan 48913")

* * *

MR. MC DERMOTT: Does this material which you have just covered with your little summary include this memorandum to Mr. Murray Stein from Sidney Edelman, Chief, Environmental Health Branch, dated October 31st?

MR. OEMING: It does not.

MR. MC DERMOTT: If I may request, Mr. Stein, if this memorandum to which I have just referred is going to become part of the record here, I would like it read aloud and made a part of the record.

MR. STEIN: We would be happy to do that. I think I have already given the date.

"MEMORANDUM

To: Mr. Murray Stein
Chief, Enforcement Branch
Division of Water Supply and Pollution Control

From: Sidney Edelman, Chief
Environmental Health Branch
Public Health Division, OGC

Subject: Water pollution control enforcement--Conference called at initiative of Secretary--Request for copies of material upon which Secretary's action was based.

"Reference is made to your inquiry whether "the Secretary, if so requested, is legally required to furnish to persons attending a conference, called by him on his own initiative under Section 8(c) of the Federal Water Pollution Control Act, the 'reports, surveys or studies' which support his 'reason to believe that any pollution referred to subsection (a) and endangering the health or welfare of persons in a State other than that in which the discharge or discharges originate is occurring.'

"In our opinion, the information upon which the Secretary's action was based, as well as the mental processes by which he reached his decision, are not subject to examination or review

"The calling of a conference, which is primarily investigative in nature (although it is also the first step in the enforcement procedures), at the initiative of the Secretary is a discretionary action within the scope of the statute. The Secretary's determination that he has 'reason to believe' that pollution subject to the Act is occurring is merely the statutory prerequisite to the calling of the conference. 1/

(1/ As previously indicated, the conference is merely the initial step in an enforcement proceeding.

"(Before the Attorney General can be requested to bring a suit on behalf of the United States to secure abatement of the pollution (Sec. 8 (f)), a hearing must be held before a statutory hearing board where all the parties have an opportunity to appear and present their evidence.) The belief of the Secretary, while a necessary condition to such action, has no effect in and of itself and neither it, nor the facts upon which it is based, form a part of the conference summary. Moreover, all proceedings for the abatement of the pollution must be brought by and in the name of the United States by the Attorney General upon request of the Secretary. Whether a suit will be instituted depends on the Attorney General, not on the Secretary. The Attorney General may or may not accede to the Secretary's request (Sec. 8 (f) (1)).

"Under such circumstances, the 'reports, surveys and studies' consulted by the Secretary, as well as the basis for his belief, are clearly not subject to judicial review. The applicable general rule was laid down in 1827 by the Supreme Court:

'Whenever a statute gives a discretionary

> "'power to any person to be exercised by him upon his own opinion of certain facts, it is a sound rule of construction that the statute constitutes him the sole and exclusive judge of the existence of those facts.' 2/ (Martin v. Mott, 25 U.S. 19, 31-32.)

"Thus, in Ewing v. Mytinger & Casselberry, 339 U.S. 594, 70 S. Ct. 870 (1950), the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 334 (a)) permitted multiple seizures when the 'Administrator has probable cause to believe from the facts found, without hearing, by him or any officer or employee of the agency that the misbranded article is dangerous to health . . . (etc.).' Suit was brought to enjoin the enforcement of the provision after multiple seizures of the defendants' product had been made following a determination of 'probable cause'. In dismissing the application, the court pointed out that there, as here, the seizures were merely preliminary to legal action, which would have to be brought by the Attorney General, and held that the administrative determination of 'probable cause', which was the statutory prerequisite to the bringing of a "lawsuit, was not subject to judicial review. 3/ (3/ See also United States v. Wrightwood Dairy Co., 127 F 2d 907 (Cir. 1942) where the finding of the Secretary of Agriculture that satisfactory statistics for a certain period were not available in the Department (thus authorizing the use of another period) was challenged. The court refused to review the question and declared (at p. 912):

> "'The Secretary made his finding and proclamation. We believe that his determination is one of discretion and not a judgment which we have a power to question.')

"Accordingly, you are advised that the Secretary is not legally required to provide any of the persons or agencies called to attend a conference copies of the 'reports, surveys or studies' consulted by him or otherwise to establish the basis for his belief. 4/ (4/ Morgan v. United States, 304 U.S. 1, 18; United States v. Morgan, 313 U.S. 409, 422.) Moreover, since the reasons for the belief of the Secretary are not subject to review, they are beyond the scope of the conference and may not be considered as one of the questions with which the conference is to deal."

MR. MC DERMOTT: Mr. Stein, in view of this memorandum of Mr. Edelman's and the expression of his opinion therein, and particularly in view of this last paragraph which you have just read off, I would like at this juncture to enter an objection to the jurisdiction of your agency to proceed with this particular conference, and I call particular attention, for the record, to the express provision of the Federal law governing the calling of this particular conference, or allegedly governing its calling.

This is Section 466 (f) of Title 33, U. S. Code. The particular subsection -- I want to be sure that I get this correctly -- I will correct that. This is 466 (g) of 33, U.S.C.A. The subsection is Sub (c) Sub, Sub (1).

The particular language I think we are interested in here, and I quote, is that:

> "The Secretary shall also call such conference whenever, on the basis of reports, surveys, or studies, he has reason to believe that any pollution referred to in Subsection (a) of this section, and endangering the health or welfare of persons in the State other than that in which the discharge or discharges originate is occurring,"

and we make our objection now to jurisdiction, and we wish to indicate, Mr. Stein, that we don't wish to withdraw that objection until such time as you provide us evidence as to this basis of reports, surveys, or studies, which is the sine qua non for the calling of this conference, without which basis we take the position that the conference cannot be lawfully and legally called under the statutes of the United States.

MR. STEIN: Thank you, Mr. McDermott.

I think the position taken by the representatives of Michigan and Wisconsin is perfectly clear, and I also think the position taken by the legal representatives of the Federal Government is also perfectly clear.

With that, we might proceed, and at this point I would like to call on Mr. Schneider to present a statement for the Federal Government.

Mr. Schneider.

MR. MC DERMOTT: Is our objection overruled?

MR. STEIN: No, it is not.

MR. MC DERMOTT: Oh.

MR. STEIN: It is entered into the record.

MR. MC DERMOTT: And no ruling thereon?

MR. STEIN: No ruling thereon.

MR. MC DERMOTT: All right.

MR. STEIN: Because, again, as I understand this, this is beyond the scope of my authority here as conference chairman.

As you will recall, it says it may not be considered one of the questions with which conferees are to deal. However, it will be certainly noted for the record.

MR. MC DERMOTT: All right.

MR. STEIN: Mr. Schneider

STATEMENT OF R. J. SCHNEIDER, CONFEREE, UNITED STATES DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

MR. SCHNEIDER: Thank you, Mr. Stein.

I would first like to introduce the Regional Health Director of our Chicago Region of the Public Health Service, Dr. Clarke W. Mangun, Jr.

Dr. Mangun, would you please take a bow?

In addition to being the Departmental Conferee, I represent the Water Supply and Pollution Control Program of this Public Health Service Region, which includes Wisconsin, Michigan and three other States. Our activities are closely keyed to the State water pollution control programs. The State agencies have been dealing with local water pollution control problems for many years and their accomplishments have been considerable. Our role in the national water pollution control program is one of vigorous support of the State agencies.

It is a privilege to be here today to be able to participate in this effort to discuss the water resources of this area. This conference can be highly beneficial by discussing the widest possible uses of these resources.

This is not the first time that Federal interest has been shown in this area, although I refer to a somewhat different kind of Federal interest. Most of you are aware of the great national attention that was focused on this area by Calvin Coolidge, when he relaxed, while President, in the solitude and beauty of the Brule River country. And I am sure that the trout of the Brule played no small role in attracting President Coolidge here. The Brule and Menominee Rivers represent a great natural resource that should be available for all -- whether that be a President, an ordinary citizen, a municipality or an industry.

We, from the Department of Health, Education, and Welfare, are here because of our enforcement responsibilities under the Federal Water Pollution Control Act. But, in addition to the specific responsibilities in connection with enforcement, this Act provides many tools for a mutually broad attack on the water pollution control problem to supplement the very significant efforts that have been put forth by the States. For example, this law authorizes the development of comprehensive plans for utilizing the water resources of our river basins. It authorizes funds for research to develop new and better methods of waste treatment. It authorizes financial assistance to State water pollution control agencies to strengthen their water pollution control programs.

R. J. Schneider

Since the passage of the 1956 Federal Water Pollution Control Act, the Wisconsin Committee on Water Pollution has been allocated almost $600,000 of this Federal financial assistance, and the Michigan Water Resources Commission has been allocated over $950,000. These figures constitute significant portions of the budgets of these agencies. Of much interest also to the local people, the law provides for substantial grants to municipalities to aid in the construction of local sewage treatment plants. Under this construction grants program, the Federal Government has aided 186 communities in Wisconsin, with grants totaling over $9.5 million, and 110 communities in Michigan, with grants totaling almost $19 million. These are only some of the activities carried [illegible] under this Act, and all of the activities and responsibilities are carried out in close cooperation with the State water pollution control agencies.

This Federal law, as we know it today, was passed in 1956 to replace the initial, but much less effective, law that had been passed eight years earlier. The law was again strengthened by amendments in 1961 and there is, even now, before Congress, yet another bill to amend the current law. This almost constant revision of the Federal law in the few short years of its existence reflects the constant and accelerated change in the attitude of the people toward water pollution. What may have been considered acceptable waste disposal practices a short time ago may not now be acceptable because of the increasing demands for clean water for all legitimate uses. So the significance of the Federal Water Pollution Control Act is that, first, it reflects the sense of national urgency on the part of the people of our country to resolve the water pollution problem. Secondly, it provides the tools on a nationwide basis for solving these problems.

We recognize that the State water pollution control agencies have made great strides toward the abatement of pollution in the Menominee River Basin and we regard the State agencies as the first line of attack in the fight against water pollution. We are here to support the States in this effort.

A survey of the waters that are under discussion today was initiated during the first two weeks of August of this year by technical representatives of the Department of Health, Education, and Welfare. Both State water pollution control agencies were invited to participate in this survey. An advance draft copy of the technical report of the survey was sent to these agencies on September 27. The final report will be presented in some detail in a few moments.

During the course of this conference, other representatives from our Department will be introduced as they are called upon to participate. Here today, also, are representatives from other Federal agencies which were notified of this conference. The broad Federal interest in this water resource is demonstrated by the fact that four of these agencies have sent representatives here to present statements. Also, a number of other Federal agencies have sent observers.

At this time we would like to call upon Mr. A. W. West, Public Health Engineer, of our Pollution Evaluation Unit of the Robert A. Taft Sanitary Engineering Center. Mr. West supervised the survey that I mentioned previously and he also co-authored the resulting technical report. Mr. West will now present a summary of this report.

I would like to call upon Mr. West now to present a summary of this report.

Mr. West.

STATEMENT OF A. W. WEST, PUBLIC HEALTH ENGINEER, POLLUTION EVALUATION UNIT, ROBERT A. TAFT SANITARY ENGINEERING CENTER, CINCINNATI, OHIO

MR. WEST: Thank you.

Chairman Stein, Conferees, participants from Wisconsin and Michigan, ladies and gentlemen:

Last summer, during a two-week period from July 30 through August 16, 1963, the Public Health Service of the United States Department of Health, Education, and Welfare conducted field surveys on the interstate waters of the Menominee and Brule Rivers, and some of their tributaries, in the States of Michigan and Wisconsin. An evaluation of the survey data and comments on the findings are presented in the November 1963 "Report on Pollution of the Interstate Waters of the Menominee and Brule Rivers, Michigan - Wisconsin."

Mr. Chairman, I would like to present a copy to the reporter, and suggest that it be included in the transcripts of this conference.

MR. STEIN: Without objection, that will be included as if read.

A. W. WEST

MR. WEST: SUMMARY AND CONCLUSIONS

The Michigan Water Resources Commission and the Wisconsin Committee on Water Pollution pursue active programs to eliminate pollution in the Menominee and Brule Rivers. Pollution has been reduced by industrial waste control practices and by construction of municipal sewage treatment plants. Compliance with orders by the Wisconsin Committee on Water Pollution should lead to further improvement. The real progress that has been made, however, has not prevented or eliminated pollution of certain reaches of the rivers.

UPPER MENOMINEE RIVER

Organic pollution discharged to the Upper Menominee River reduced the symmetrical mean dissolved oxygen content of the river below the 3.0 mg/l level considered critical for fish life by the State of Wisconsin. Minimum values observed during August, 1963 at each sampling station fell to 2.3 at the Norway power dam 8 miles below Niagara and 1.2 mg/l at Faithorn, Michigan, some 15 miles below Niagara. At each of these two sampling stations all samples contained less than 5 mg/l and 6 out of 10 of the samples contained less than 3 mg/l.

Solids pollution, including wood chips and fibers, bacterial slimes, and floating scum and septic sludge, degraded the appearance of the river and reduced its aesthetic appeal for general recreational use. Solids settled to form sludge deposits which prevent the use of this area for fish spawning and decrease the population of pollution sensitive fish food organisms for some 22 miles below Niagara, Wisconsin.

The Kimberly-Clark pulp and paper mill in Niagara, Wisconsin, is the principal source of organic and solids pollution.

For a distance of 14 miles below Niagara, Wisconsin, and 9 miles below the mouth of Sewer Creek, the Upper Menominee River contains more than the 5,000 MPN/100 ml total coliform level considered satisfactory for general recreational use. The symmetrical mean density reached 43,500 MPN per 100 ml at the Norway power dam located below Niagara and Norway.

Waste from undetermined sources in Niagara, Wisconsin, effluent from the Niagara, Wisconsin, sewage treatment plant and untreated sewage from Norway, Michigan, are principal sources of bacterial pollution. The proportionate load from each of these sources was not determined.

The Upper Menominee River also shows evidence of degradation by sludge deposits, producing large populations of pollution tolerant organisms and limiting the development of sensitive bottom forms in the quiet water areas extending from the Iron Mountain-Kingsford sewage treatment outfall to the neck of the impoundment above Upper Quinnesec Dam.

LOWER MENOMINEE RIVER

The Lower Menominee River is degraded for a distance of 3 miles below the Scott Paper Company, at Marinette, Wisconsin, to its mouth by wood chips and fibers, slime bacteria, and the elimination of bottom organisms. This pollution adversely affected the physical appearance of the river and reduced its aesthetic appeal for general recreational use. The Scott pulp and paper mills in Marinette, Wisconsin, and Menominee, Michigan, are principal sources of pollution above the Marathon Paper Company. Solids from the Marathon Paper Company contribute to pollution at the mouth of the river.

The mean total coliform density of the Lower Menominee River was increased to 8,500 MPN/100 ml, slightly higher than the 5,000 level considered satisfactory for general recreational use. Effluent from the Marinette, Wisconsin, sewage treatment plant is the principal source of bacterial pollution in the Lower Menominee River.

BRULE RIVER

Bacterial pollution in the Iron River, which contains treated sewage from the neighboring communities of

Iron River, Stambaugh, Caspian and Gaastra, Michigan, increased the total coliform density of the interstate Brule River waters above the 5,000 MPN/100 ml level considered satisfactory for general recreational use for a distance of more than 5 miles, and most probably 8 miles, below the mouth of the Iron River. The symmetrical mean total coliform density increased from 395 MPN/100 ml above the Iron River to 14,200 MPN/100 ml at the sampling station 5 miles below the mouth of the Iron River. The proportionate amount of this coliform load discharged by each one of the four communities located on the Iron River has not been determined.

For approximately 14 miles, gravel areas on the bottom of the river are cemented together with iron deposits which drastically reduce desirable fish food organisms and interfere with fish spawning. Although much of the damage was done by gross iron pollution which was discontinued in 1963, further investigations will be needed to determine whether or not the present iron mine drainage continues to degrade the river bottom.

Pollution of the Menominee and Brule River is evident. Pollution originating in Michigan and Wisconsin damaged the water quality of the Michigan and Wisconsin waters of these interstate rivers. Pollution, endangering the health and welfare of persons in a State other than in which the pollution originates, is subject to abatement under the Federal Water Pollution Control Act.

BACKGROUND

On the basis of reports, surveys, and studies the Secretary of Health, Education and Welfare having reason to believe that pollution of the Brule and Menominee Rivers in Michigan and Wisconsin is endangering the health or welfare of persons in both States, called a Conference in Menominee, Michigan, for November 6, 1963.

This report prepared for this Conference is based on data and information assembled through the cooperation of numerous Federal, State and local agencies, communities and industries in Michigan and Wisconsin, and on additional data obtained in the field during July 30 through August 16, 1963. Field data were collected by the staffs of the Technical Advisory and Investigations Section, Technical Services Branch, and the Great Lakes-Illinois River Basin Project, United States Public Health Service.

The invaluable assistance of the cooperating groups that provided background data and information essential to this report is gratefully acknowledged.

THE AREA

This report is concerned with the reach of the Brule River which serves as a boundary between Michigan and

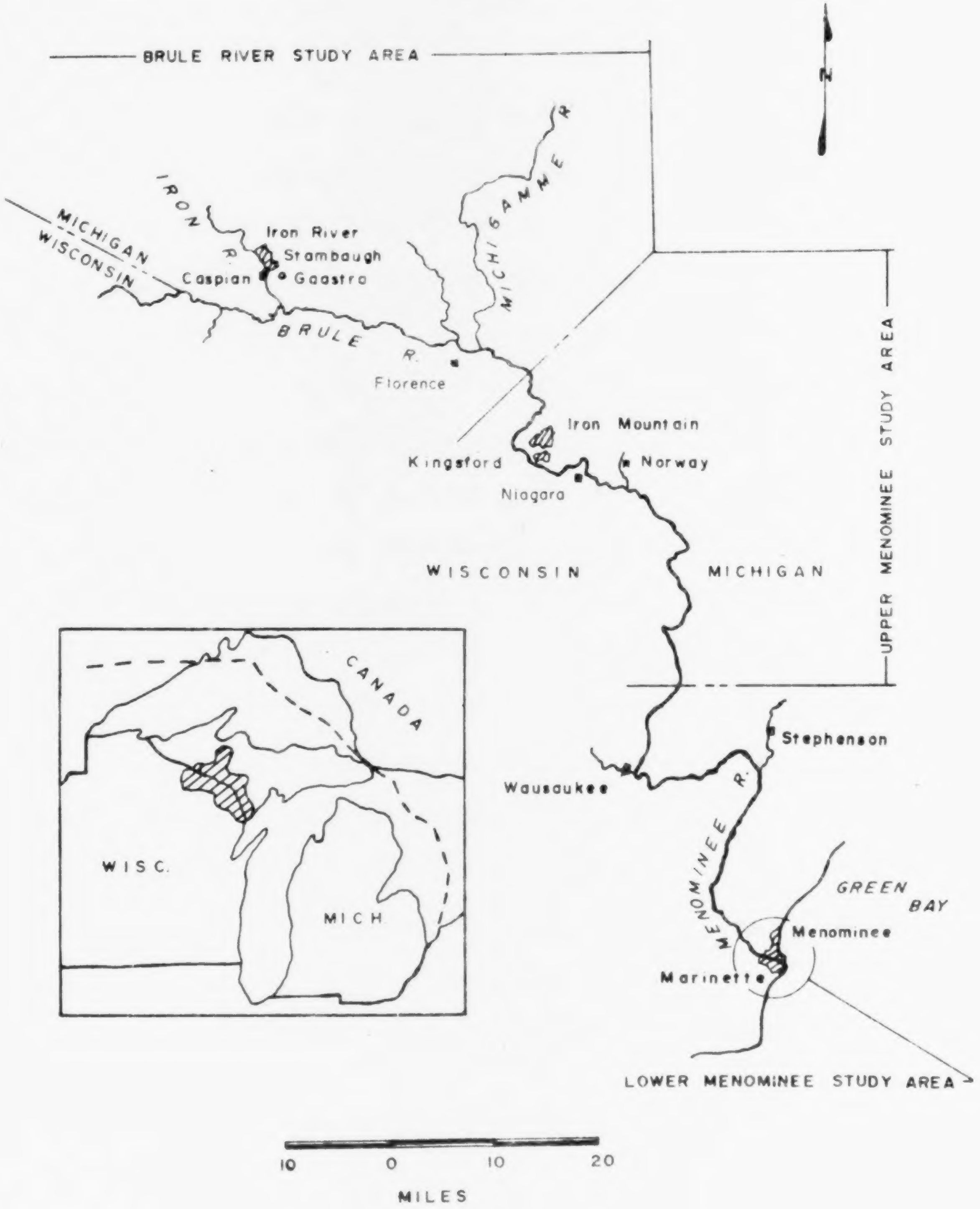
Wisconsin; the Menominee River, which is a boundary stream throughout its entire length; and those tributaries of both streams that carry wastes which contribute to pollution of the interstate waters.

The Brule River (Figure 1) rises in northern Wisconsin near the eastern edge of a popular recreational area which is dotted with innumerable natural lakes. The river flows through Wisconsin in an easterly direction to a point near Nelma, Wisconsin, where it becomes the boundary between Michigan and Wisconsin. About 40 miles downstream from this point the Brule joins the Michigamme River, flowing from the north in Michigan, to form the Menominee River near Florence, Wisconsin. The Menominee River continues as the State boundary flowing in a southeasterly direction for about 115 miles to the Menominee, Michigan,- Marinette, Wisconsin, area, where it enters the Green Bay arm of Lake Michigan.

The Brule and Menominee Rivers pass through a gently rolling, thickly wooded valley which exhibits a restful scenic beauty. The virgin white pine forests of the valley, which once provided a major national source of white pine lumber, have largely been replaced by the attractive quaking aspen, interspaced with groups of a variety of conifers and an occasional hardwood.

(Figure 1 is as follows:)

LOCATION MAP
MENOMINEE RIVER
WISCONSIN -- MICHIGAN
FIGURE 1


BRULE RIVER STUDY AREA
N
MICHIGAMME R.
IRON R.
MICHIGAN
WISCONSIN
Iron River
Stambaugh
Caspian
Gaastra
BRULE R.
Florence
Iron Mountain
Kingsford
Norway
Niagara
UPPER MENOMINEE STUDY AREA
WISCONSIN
MICHIGAN
CANADA
WISC.
MICH.
Stephenson
Wausaukee
MENOMINEE R.
GREEN BAY
Menominee
Marinette
LOWER MENOMINEE STUDY AREA
10
0
10
20
MILES

The wooded expanses are broken only occasionally by towns, small communities and farms.

Important industrial operations occur in the Iron Mountain-Kingsford, Michigan, Niagara, Wisconsin, and Marinette-Menominee areas. Iron ore, pulp and paper, and organic chemicals are the major industrial products.

The dark waters of the Brule and Menominee rivers derive natural color from the swampy areas drained by these streams and their tributaries. Both streams tumble over numerous rapids and eleven dams on the Menominee River, taking advantage of the steep slope of the stream for production of hydroelectric power. There also are a few dams on major tributaries.

The two interstate streams and their tributaries constitute the major surface water resource of the valley. This resource is an essential supplement to the natural beauty and cool summer temperatures of the valley if its full recreational potential is to be realized in competition with that of the adjacent area to the west where natural lakes abound.

WATER USES

The Brule and Menominee Rivers provide opportunity for a variety of water uses.

MUNICIPAL WATER SUPPLY

The combined total use of river water by these plants is about 18.0 million gallons per day.

HYDROELECTRIC POWER

Between Florence, Wisconsin, and the Menominee-Marinette area there are eleven dams which impound run-of-the-river pools on the Menominee River. One of these, at Kremlin Falls, has been abandoned. One is operated to produce power for the town of Norway, Michigan, one to produce power for the Kimberly-Clark pulp and paper mill, two to power the Scott pulp and paper mills at Marinette, Wisconsin, and at Menominee, Michigan, and others to produce power for sale by the Wisconsin-Michigan Power Company and the Wisconsin Public Service Corporation.

None of the dams includes facilities for the passage of migratory fish. The quiet pools above some of the dams enhance the recreational potential of the river.

RECREATION

The Brule and Menominee rivers are suitable for various recreational uses. The full recreational potential of the rivers has not yet been realized.

Fishing

Fishing probably is the major present recreational use of the waters of the two rivers.

The cool, swift waters of the upper reaches of the Brule River provide an ideal habitat for trout, and there are numerous trout fishing enthusiasts in the area.

The warmer waters of the Menominee are not generally suitable for trout, but do support sturgeon, walleye, bass, crappie, blue gill, and other sport as well as rough fish. Sport fishermen use the river at accessible intervals along its length; the greatest use is in the Marinette-Menominee area.

Boating

Because of swift, shallow rapids, some reaches of the river are suitable only for canoeing. There is some use of the pools above the power dams by outboard motor boats. Here again, major power boat use is in the Marinette - Menominee area, where a large boat docking and service area is available. Many of the boats at this marina are large lake-going vessels.

Swimming

The water of the Brule River is too cool to encourage swimming, and there are no known beaches on the Menominee. Where water is suitable, however, there will be some swimming by individuals on an unorganized basis, and the Menominee undoubtedly is no exception.

There are five beaches for organized swimming along the lake front in the Menominee - Marinette area. Water from the Menominee River undoubtedly reaches all of these beaches at times.

WASTE DISCHARGES

MAJOR AREAS

Upper Menominee River

Near the upper end of the Menominee River, Iron Mountain, Kingsford and Norway, Michigan and Niagara, Wisconsin, discharge sewage. All except Norway, which has no plans for sewage treatment, discharge treated sewage directly to the Menominee. Norway discharges raw sewage to Sewer Creek about three miles from the river. The Kimberly-Clark Corporation discharges residual sulfite and ground-wood pulp and paper mill wastes to the Menominee River at Niagara.

Lower Menominee River

Near the mouth of the Menominee River, Marinette, Wisconsin, and Menominee, Michigan, discharge treated sewage to the river. In Marinette, the Scott Paper Company discharges residual sulfite pulp and paper mill wastes and the Ansul Chemical Company discharges wastes from the manufacture of organic chemicals. In Menominee the Marathon Division of American Can Corporation discharges paper mill wastes and the Scott Paper Company discharges ground-wood pulp wastes.

Brule River

Four small towns, Iron River, Stambaugh, Caspian, and Gaastra, discharge sewage, after varying degrees of treatment, to the Iron River in the reach from 5 to 8 miles above its junction with the Brule River. The Homer-Wauseca, Sherwood and Hiawatha #1 and #2 iron mines discharge mine drainage containing acid, iron and silt to the Iron River. Florence, Wisconsin, discharges treated sewage near the mouth of the Brule.

MINOR AREAS

Other sources of wastes in the valley are small towns and industries situated on tributaries at varying distances from the two interstate streams. One of these, Stephenson, Michigan, presently is discharging raw sewage to Little Cedar River while the old sewage treatment plant is being replaced by construction of a new plant.

Wastes from the White House Milk Company of

Stephenson, Michigan, receive secondary treatment before being discharged to the Little Cedar River.

Individual septic tanks are used in Wausaukee, Wisconsin, and an oxidation pond sewage treatment plant is under construction. The Pauley Cheese Company of Wausaukee discharges wash water to the Wausaukee River, but concentrated whey is collected and returned to the farmers.

The high purification rates of the tributaries prevent contributions of several minor waste sources from having any pollutional effect on the interstate waters. There are problems of local, intrastate pollution for which corrective measures are needed.

CONTROL ACTIVITIES OF STATE AGENCIES

The Michigan Water Resources Commission and the Wisconsin Committee on Water Pollution adopted a joint resolution concerning waste treatment requirements for the Brule and Menominee Rivers and tributaries in 1954. The resolution provided that sewage should be treated by at least effective sedimentation and disinfection with higher degree of treatment, if necessary. Industrial wastes should be treated to the degree warranted in each case. The two State water pollutional control agencies have worked with municipalities and industries to accomplish the objectives of the joint resolution.

Iron Mountain, Kingsford and Menominee provide primary treatment with two-stage, pre- and post-chlorination. Niagara and Marinette provide primary treatment with single stage chlorination. Stambaugh provides secondary treatment with single stage post chlorination. Florence, Wisconsin, does not provide chlorination, but has a sewage stabilization pond which accomplishes significant bacterial reduction. Caspian and Gaastra, Michigan, have inadequate sedimentation facilities and do not provide chlorination. Norway, Michigan, has a sewerage system but does not provide sewage treatment. Iron River, Iron Mountain, Kingsford and Norway, Michigan, and Florence and Marinette, Wisconsin, have combined sewers, and Menominee, Michigan, and Niagara, Wisconsin, have partially combined and partially separate sewer systems. During storms, raw sewage without primary treatment or chlorination may escape from the combined sewers to adjacent water courses.

The Wisconsin State Committee on Water Pollution in February, 1963, ordered Niagara to develop a plan for separation of storm and sanitary sewers by July 1, 1964.

Stephenson, Michigan, is building a new sewage treatment plant.

The iron mines, with the exception of Hiawatha #1, provide lagoons which settle portions of the silt and insoluble iron. The Homer-Wauseca mine formerly was the major source of acid mine drainage pollution in this area. This problem has been reduced by diverting fresh water away from the mine and discontinuing the pumping of acid iron bearing waters from the mine shaft.

The Kimberly-Clark Corporation at Niagara provides facilities for fiber recovery, and hauls portions of sulfite waste liquor for use as road binder. During periods of low stream flow additional sulfite waste liquor is disposed of by spray irrigation. In 1954, the Wisconsin State Committee on Water Pollution ordered this company to submit satisfactory plans for reducing sulfite waste liquor by March 31, 1955, and to complete construction of facilities by December 31, 1955. In February, 1963, the Committee ordered the company to submit plans for additional reduction of pollutional matter discharged from the pulp mill by July 1, 1964.

At Marinette, Wisconsin, the Scott Paper Company provides facilities for fiber recovery, and disposes of a portion of the sulfite waste liquor for use as a road binder. In February, 1963, the Wisconsin State Committee on Water Pollution ordered the company to submit plans for additional reduction in wastes by July 1, 1964. Several years ago acid wastes from the Ansul Chemical Company caused gross pollution of the Menominee, but discontinuance of the manufacturing process that produced the acid has eliminated the problem.

In Menominee, Michigan, the Scott Paper Company plant provides facilities for fiber recovery. The Marathon Plant also provides facilities for fiber recovery, and for recovery of wax, which formerly caused a pollution problem.

Federally Aided Sewage Treatment Facilities

Located within the Menominee River interstate area are seven sewage treatment projects which have received construction grant aid under the Federal Water Pollution Control Act. Four of these projects have been completed, and two are presently under construction. The latest project is in the final stage of preparation prior to the start of construction. These projects comprise a total eligible cost of $1,114,303.00, which includes $347,783.00 of Federal grants. Table 1 displays a summary of information relative to each of these projects.

(Table 1 is as follows:)

TABLE 1

FEDERALLY-AIDED SEWAGE TREATMENT FACILITIES WITHIN THE MENOMINEE RIVER INTERSTATE AREA

MUNICIPALITY	COUNTY	DATE OF OFFER	AMOUNT OF GRANT	ELIGIBLE PROJECT COST	TYPE OF PROJECT	STATUS
MICHIGAN						
Iron Mountain-Kingsford	Dickinson	6-11-59	135,600	467,512	Primary with chlorination	Completed 11-4-60 - WPC
Iron River	Iron	11-29-57	58,940	196,468	Primary with chlorination	Completed 11-5-59 - WPC
Iron River	Iron	10- 8-63	6,250	12,500	Interceptor	Plans and specifications under preparation - APW
Stambaugh	Iron	11-15-57	58,048	199,288	Interceptor and Activated Sludge	Completed 11-18-58 - WPC
Stephenson	Menominee	1- 7-63	46,200	114,800	(Additions) Trickling filter with chlorination	Under construction - APW
WISCONSIN						
Florence	Florence	10-18-57	16,395	55,335	Stabilization pond	Completed 11-6-59 - WPC
Wausaukee	Marinette	1- 9-63	26,350	68,400	Stabilization pond	Under construction - APW

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RIVER DISCHARGE AND DROUGHT FLOW RECORDS

Summer rainfall in this area was the lowest experienced for many years. Water withdrawn from storage behind the power dams supplemented discharges in the Menominee River. During the twelve days of the August 5-16, 1963, survey the mean daily river discharges averaged 48 cubic feet per second (cfs) in the Iron River and 300 cfs at the mouth of the Brule. The Menominee River discharges averaged 1200 cfs in the Niagara area, 1330 cfs at Chalk Hill Dam (river mile M-56.6), and 1400 cfs at the Grand Rapids Dam some 25 miles above Marinette.

The critical minimum river discharges that can be expected in this area are published in the "Drought Flow of Michigan Streams" developed by the Department of Environmental Health, School of Public Health, University of Michigan, in cooperation with Michigan Water Resources Commission. Following is a comparison of the projected drought flows with the twelve day average Menominee River discharges that occurred near Iron Mountain and above Marinette during the survey.

Menominee River at Twin Falls Dam - Near Iron Mountain, Michigan (M-105.5)

Drought flow records indicate that a minimum twelve-day average flow of 975 cfs can be expected during some period each year. Once every five years this minimum twelve-day average could drop to 700 cfs and it could fall as low as 590 cfs once every ten years.

The 1130 cfs average discharge observed at this station during the survey is slightly greater than the drought flow that can normally be expected once each year.

Menominee River at Grand Rapids Dam - Below Koss, Michigan (M-24.7)

Drought flow projections show that minimum twelve-day average discharges can be expected to fall to 1620 cfs each year, to 950 cfs once every five years, and to 720 cfs once every ten years.

At this station, the observed 1412 cfs average discharge was 13 percent less than the most probable annual minimum drought flow. The records indicate that flow rates prevailing during the survey can be expected to recur once every two or three years.

Design Criterion

The minimum seven day average river discharge that will most probably occur once every ten years is a commonly accepted design criterion for pollution abatement work. Pollution abatement facilities should, therefore, be capable of reducing pollution loads to levels that can be discharged into the Menominee River system without damaging the water resources during critical periods when the river discharge is considerably lower than the flows that prevailed during the August 1963 survey.

UPPER MENOMINEE RIVER

SOURCES OF WASTES

Wastes from a pulp and paper mill, effluents from two sewage treatment plants and raw sewage from a third community enter the Upper Menominee River. Locations of these discharges are shown on Figure 2.

The estimated organic and solids waste loads are posted on Table 2 and illustrated on Figures 3 and 4. Organic pollution was measured by the five-day Biochemical Oxygen Demand test (B.O.D.) which is a measure of the dissolved oxygen used by organic matter in water. The results of the B.O.D. Test are expressed in population equivalents (P.E.) with one population equivalent equal to 0.167 pounds of 5-day B.O.D. per day.

(Figures 2, 3 and 4, and Table 2 are as follows:)

UPPER MENOMINEE RIVER

LOCATION MAP

FIGURE 2

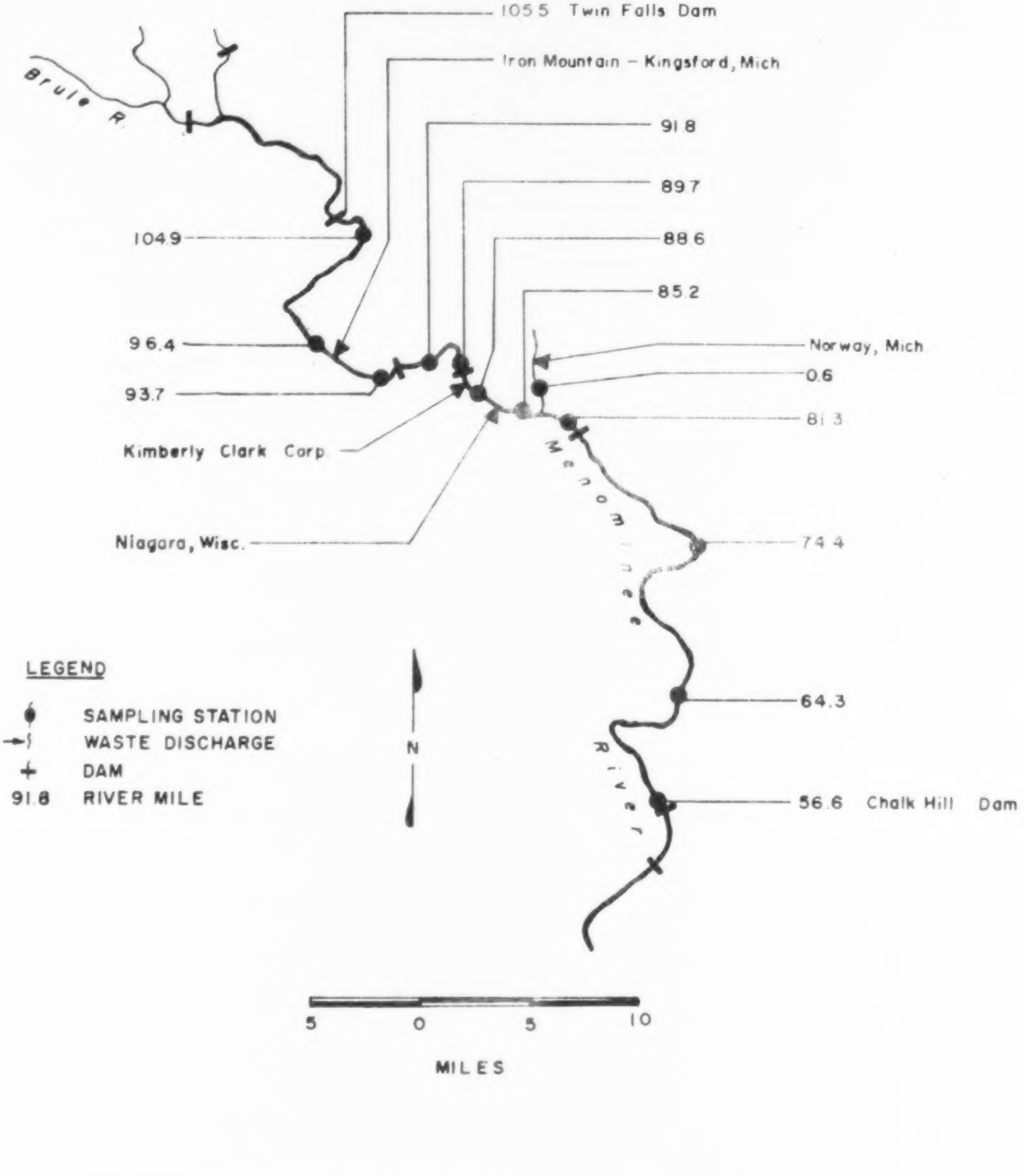

105.5 Twin Falls Dam
Iron Mountain – Kingsford, Mich
91.8
89.7
88.6
85.2
Norway, Mich
0.6
81.3
74.4
64.3
56.6 Chalk Hill Dam
Brule R.
104.9
96.4
93.7
Kimberly Clark Corp.
Niagara, Wisc.
Menominee River
LEGEND
SAMPLING STATION
WASTE DISCHARGE
DAM
91.8 RIVER MILE
N
5
0
5
10
MILES

TABLE 2

SOURCES OF WASTES

Estimated Net Loads to Upper Menominee River

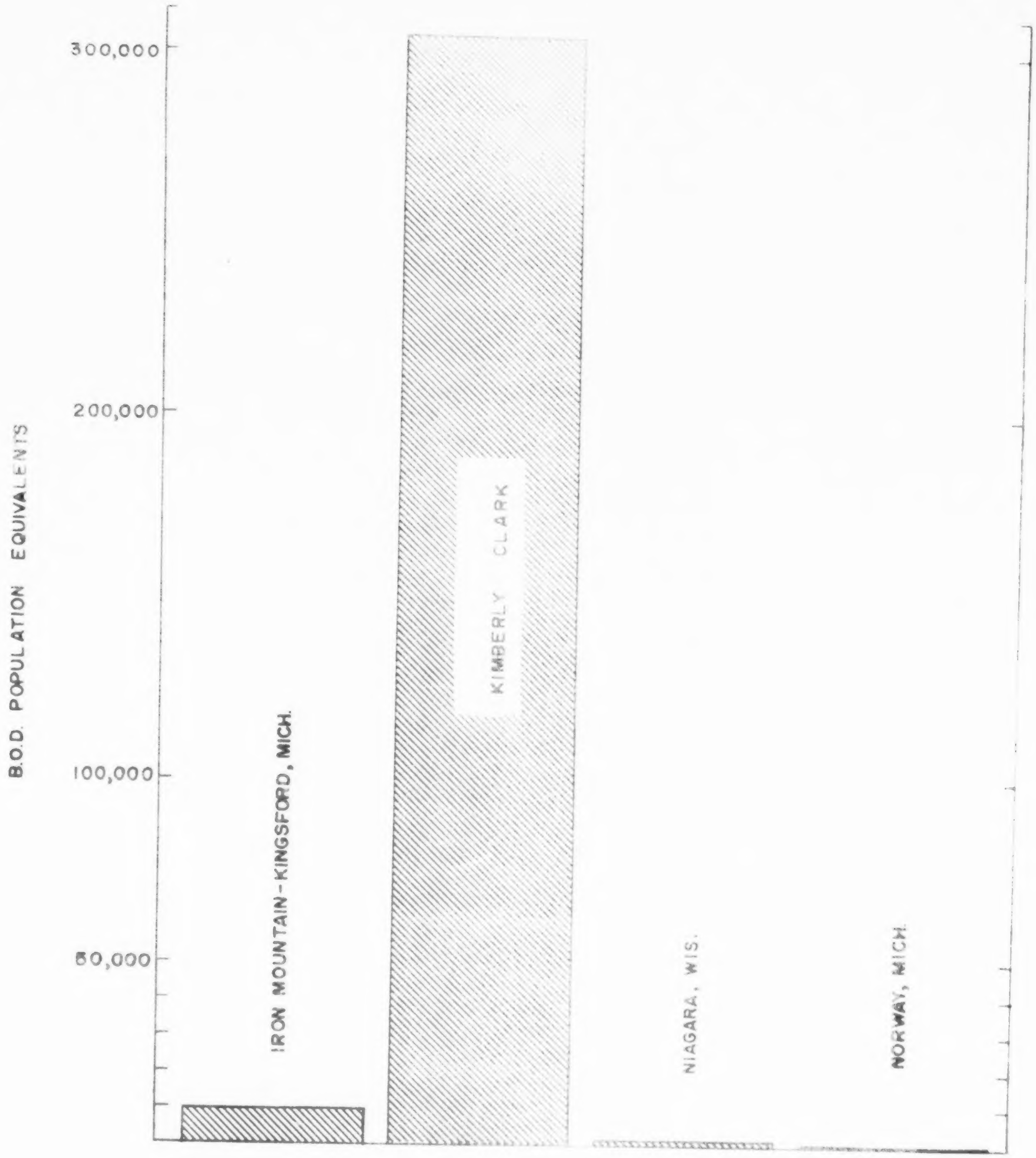
August, 1963

SOURCE	ORGANIC WASTES (5-Day BOD)		SOLIDS WASTES (Vol. Susp. Solids)	
	Population Equivalents	% of Total	Tons/Day	% of Total
Iron Mountain-Kingsford, Michigan(1) (Primary Treatment with pre- and post-chlorination)	9,800	3.1	0.2	2
Kimberly-Clark Corp.(2) Niagara, Wisconsin (Fiber recovery, spray irrigation, and hauling for road binder)	304,800	96.1	10.1	96
Niagara, Wisconsin(3) (Primary Treatment with prechlorination)	1,500	0.5	0.1	1
Norway, Michigan(4) (No Treatment - raw sewage discharged to Sewer Creek)	840	0.3	0.1	1
TOTAL -	316,940	100.0	10.5	100

---

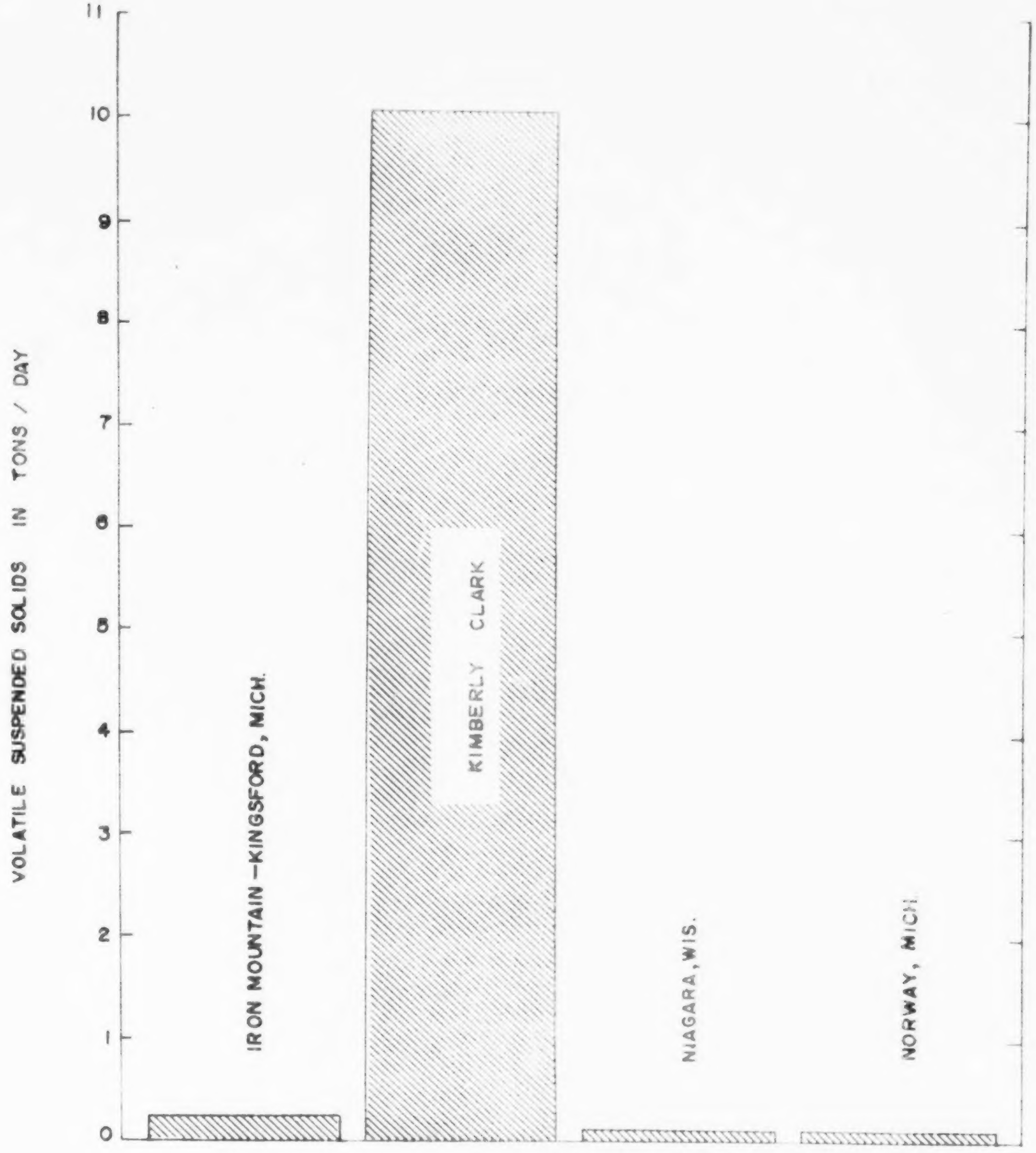
(1) Data from Sewage Treatment Plant operating reports.
(2) Calculated from basic data provided by Kimberly-Clark Corporation.
(3) P.E. from 1963 rough draft for Revised 1960 Summary Report. Solids calculated from P.E. estimate and average reductions.
(4) Calculations based on samples collected from Sewer Creek near mouth.

SOURCES OF WASTES
BOD POPULATION EQUIVALENTS
UPPER MENOMINEE RIVER
FIGURE 3



SOURCES OF WASTES
VOLATILE SUSPENDED SOLIDS
UPPER MENOMINEE RIVER

FIGURE 4



Approximately 305,000 P.E., amounting to 96 percent of the total 317,000 P.E. of organic wastes entering the Upper Menominee River was discharged by the Kimberly-Clark Corporation pulp and paper mill in Niagara, Wisconsin. Effluents from the Iron Mountain-Kingsford and Niagara treatment plants, and raw sewage from Norway contributed the remaining 4 percent of the organic load.

Approximately 10 tons per day of volatile suspended solids, amounting to 96 percent of the total 10-1/2 tons per day, was discharged by the Kimberly-Clark mill. The other 4 percent was discharged by the three previously named communities.

EFFECTS ON WATER QUALITY

5-day Biochemical Oxygen Demand (B.O.D.)

Figure 5 shows that the B.O.D. of the Menominee River, averaging 1.1 mg/l above Kimberly-Clark, increased to 16.8 mg/l in the waste stream along the Wisconsin side of the river about one mile below the paper mill. At the U.S. Highway 8 bridge (M-85.2), 4-1/2 miles below the mill, the wastes were mixed throughout the Michigan and Wisconsin waters, across the entire river and the B.O.D. averaged 5.0 mg/l.

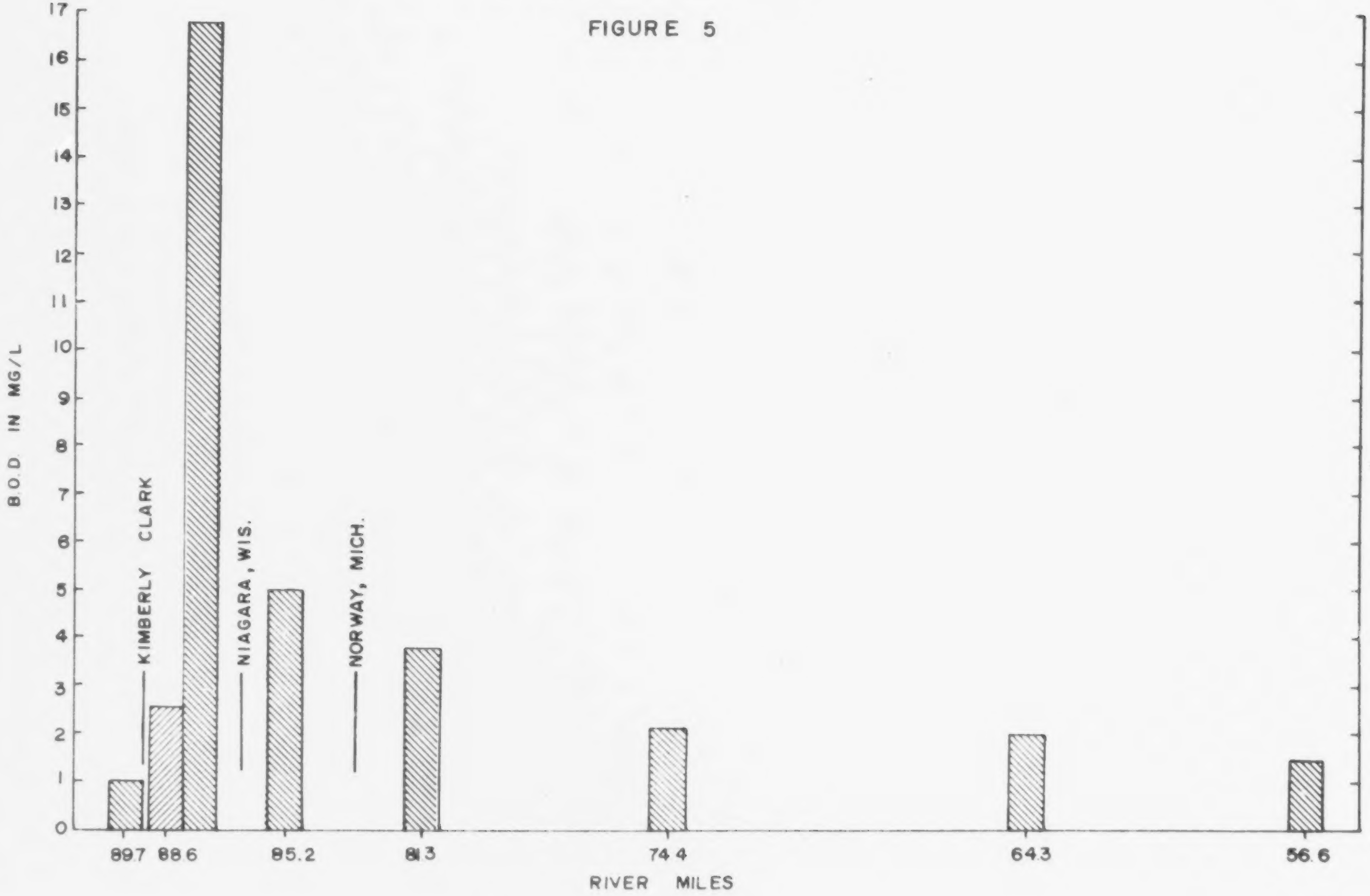
Natural purification reduced the B.O.D. throughout the [illegible] Chalk Hills Dam, (M-56.6), where it reached the level of 1.5 mg/l. The effect of this biochemical oxygen demand on the river is discussed in the next section on dissolved oxygen.

(Figure 5 is as follows:)

B.O.D.

UPPER MENOMINEE RIVER

FIGURE 5



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Dissolved Oxygen (D.O.)

For sustained propagation of a normal healthy warm water game fish population, fresh water rivers and lakes should contain at least 5.0 mg/l of dissolved oxygen. Although moderate reductions of dissolved oxygen below this level for short periods of time may not injure adult fish, it is generally agreed that the dissolved oxygen concentration should not be reduced below a minimum of 3.0 mg/l at any time

The review draft of the second edition of "Water Quality Criteria," prepared for the California Water Pollution Control Board, states that: "For fish and other aquatic life, the recommendations of the Aquatic Life Advisory Committee of ORSANCO (as quoted above) appear to be logical." This recommendation is quoted as follows:

> "The Aquatic Life Advisory Committee of ORSANCO (2408) has recommended that the minimum permissible oxygen concentration for a well-rounded warm water fish population be as follows: The dissolved-oxygen content of warm water fish habitats shall be not less than 5 mg/l during at least 16 hours of any 24-hour period. It may be less than 5 mg/l for a period not to exceed 8 hours within any 24-hour period, but at no time shall the oxygen content be less than 3 mg/l. To sustain a coarse

> "fish population, the dissolved-oxygen concentration may be less than 5 mg/1 for a period of not more than 8 hours out of any 24-hour period, but at no time shall the concentration be lower than 2 mg/1."

The Wisconsin Committee on Water Pollution defines dissolved oxygen limitations as follows:

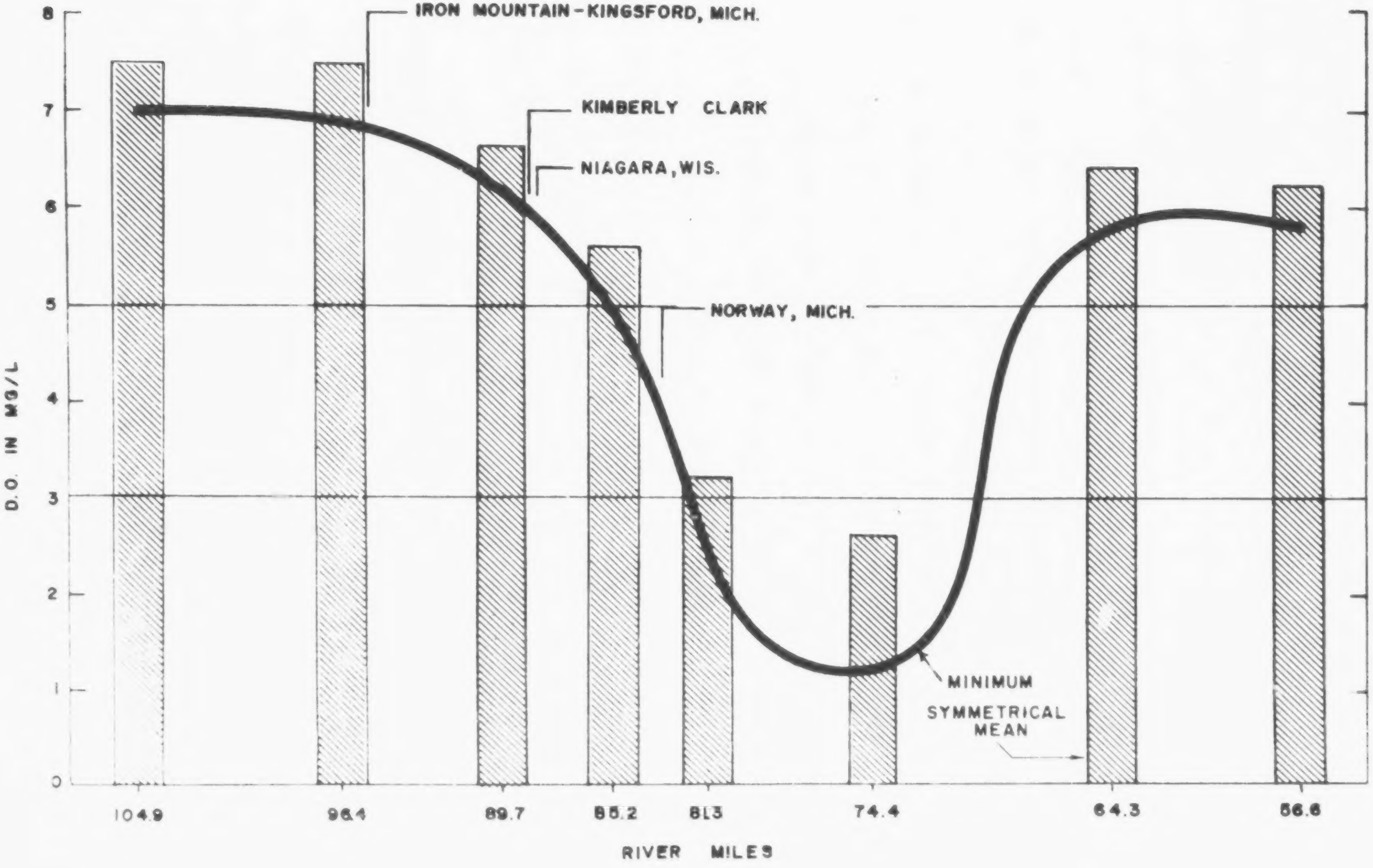
> "The Dissolved Oxygen (DO) in parts per million (p.p.m.) is a measure of the amount of oxygen dissolved in water. A saturated solution of dissolved oxygen in water will contain about 14.0 p.p.m. at 0° and about 8.5 p.p.m. at 25° C. Concentrations of less than 5.0 p.p.m. DO interfere with fish propagation and concentrations of less than 3.0 p.p.m. DO are considered critical for fish life."

The extent to which organic pollution lowered the dissolved oxygen concentrations in the Upper Menominee River during the August, 1963, survey is illustrated on the D.O. chart, Figure 6. The solid line traces minimum observed D.O. and the bars represent the symmetrical mean of all samples collected at each station.

(Figure 6 is as follows:)

DISSOLVED OXYGEN
UPPER MENOMINEE RIVER

FIGURE 6



The symmetrical mean D.O.'s were determined as follows: All D.O.'s observed at each sampling station were arrayed in descending order and plotted on probability paper. The symmetrical mean D.O. is the level at which the observed D.O. trend line crossed the 50 percent time of occurrence line. Thus, the dissolved oxygen concentration in the river was equal to or less than the symmetrical mean D.O. value 50 percent of the time.

The symmetrical mean dissolved oxygen was reduced from 7.5 mg/l above Kingsford (M-96.4) to 6.6 mgl above the Kimberly-Clark dam (M-89.7), some 6-1/2 miles downstream from the Iron Mountain-Kingsford Sewage discharge. Water in the impoundment above the Kimberly-Clark dam remained satisfactory, but the dissolved oxygen concentration had decreased 0.9 mg/l. Calculations indicate that only 1/3 of this oxygen reduction or less than 0.3 mg/l, can be attributed to the treated sewage discharge by Iron Mountain-Kingsford The remainder may be caused by decomposition of the sludge deposits which were observed along the river bottom from Kingsford to the neck of Upper Quinnesec Reservoir.

Wastes from the Kimberly-Clark mill are discharged to the river below the power dam in Niagara. For more than 15 miles below this point the dissolved oxygen was progressively reduced by the decomposition of organic wastes in the river.

During the August 1963 survey, the mean dissolved oxygen concentrations fell to 3.2 mg/l at the Norway Power Dam (M-81.3) and to 2.6 mg/l at the railroad bridge near Faith, Michigan, (M-74.4), some 15 miles below the paper mill sewers. At each of these two stations, all samples contained less than 5 mg/l and 6 out of 10 of the samples contained less than 3 mg/l. Furthermore, the minimum values recorded at these two stations were 2.3 and 1.2 mg/l respectively.

This severe reduction in dissolved oxygen, caused almost entirely by waste discharges from the Kimberly-Clark pulp and paper mill in Niagara, reduced the Menominee River water quality below the critical level for fish life.

Natural purification in the next 10-mile reach of the river increased the mean dissolved oxygen concentration to 6.4 mg/l at the Wisconsin County Trunk Z sampling station (M-64.3), about 25 miles below the paper mill discharge.

Suspended Solids

From Niagara, Wisconsin, down to the Norway power dam, the appearance and esthetic appeal of the Menominee River suffered greatly from the effects of solids pollution entering the stream. Suspended material, floating down the stream, produced a yellowish turbid appearance and scattered patches of decomposing sludge were observed floating on the surface of the water.

The mass of volatile solids suspended in the river, calculated from data collected during the survey, amounted to 2.3 tons per day above Niagara. About one mile below the pulp and paper mill (M-88.6), the solids content increased sharply to 13 tons per day. Downstream these values tapered off to 7.8 at County Trunk Z (M-64.3), and 4 tons per day in the impoundment above Chalk Hills Dam (M-56.6), some 33 miles below Niagara.

This degraded appearance, caused principally by solids discharged in the paper mill wastes, damaged the recreational potential of this reach of the Menominee River.

BIOLOGY

Past Studies

A report on a biological study conducted July 1 - August 1, 1961, by the Wisconsin Committee on Water Pollution, discussed benthic conditions in the Menominee River from Upper Quinnesec flowage above Niagara, Wisconsin, to Kremlin Falls, approximately 16 miles below Niagara. Above Niagara, the bottom organism community was considered normal for the environment for which the samples were collected. Below Niagara, slime bacteria were observed attached to bottom materials and shoreline debris. In the region of Pier's

Gorge, pollution tolerant organisms predominated. Just below Sturgeon Falls, 12 varieties of bottom biota were reported, but sensitive organisms were confined to one species of caddisfly larva and a riffle beetle. A return to a normal bottom dwelling population was reported at Kremlin Falls.

Current Biological Data

In the Kingsford-Iron Mountain, Michigan area, samples were taken one-half mile above the sewage treatment plant outfall, one-half mile below the outfall, and again where the river enters Upper Quinnesec reservoir (Figure 7). Above the sewage plant outfall there existed a balanced bottom dwelling community consisting of many sensitive organisms and relatively few very tolerant sludgeworms. These bottom organisms indicate the suitability of the stream at this point for the development of normal stream life, including fish. Some 200 yards below the sewage treatment plant, on the Michigan side, a sample collected from an area of sludge deposition revealed only sludgeworms and bloodworms, the former reaching population exceeding 37,000 per square foot. This represents a polluted environment. At the sampling site, one-half mile below the outfall, sensitive forms were much reduced compared to the station one mile above, and sludgeworms had increased from four per square foot to 335 per square foot. As the river enters Upper Quinnesec reservoir, suspended solids settle, forming a delta around the neck of the reservoir. Samples from this area, collected from 50 feet of water, revealed a sludgeworm population exceeding 950 per square foot and no sensitive organisms, representing a habitat polluted with sludge. These sludge deposits eliminate most fish food that would normally develop on the bottom at this point. The bottom material had a definite sewage odor. Additional samples, collected from the upper end of the reservoir but away from the river channel revealed burrowing mayflies and gill-breathing snails, and a much reduced sludgeworm population, indicating that the polluted habitat is limited to the neck of the reservoir. Bottom conditions where the Menominee River enters Upper Quinnesec reservoir appeared worse during the current survey than during the 1961 Wisconsin survey.

(Figure 7 is as follows:)

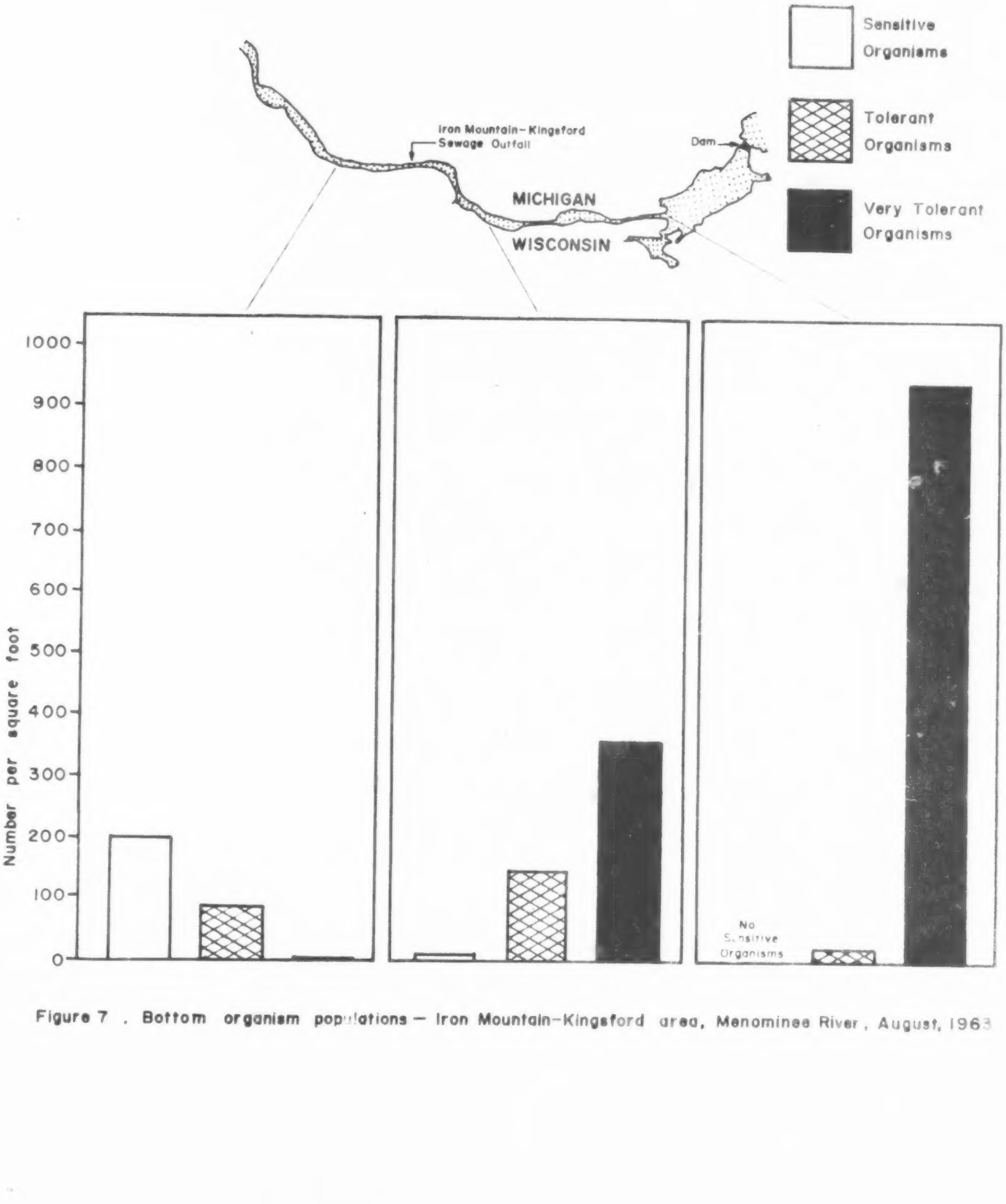


Figure 7 . Bottom organism populations — Iron Mountain-Kingsford area, Menominee River, August, 1963

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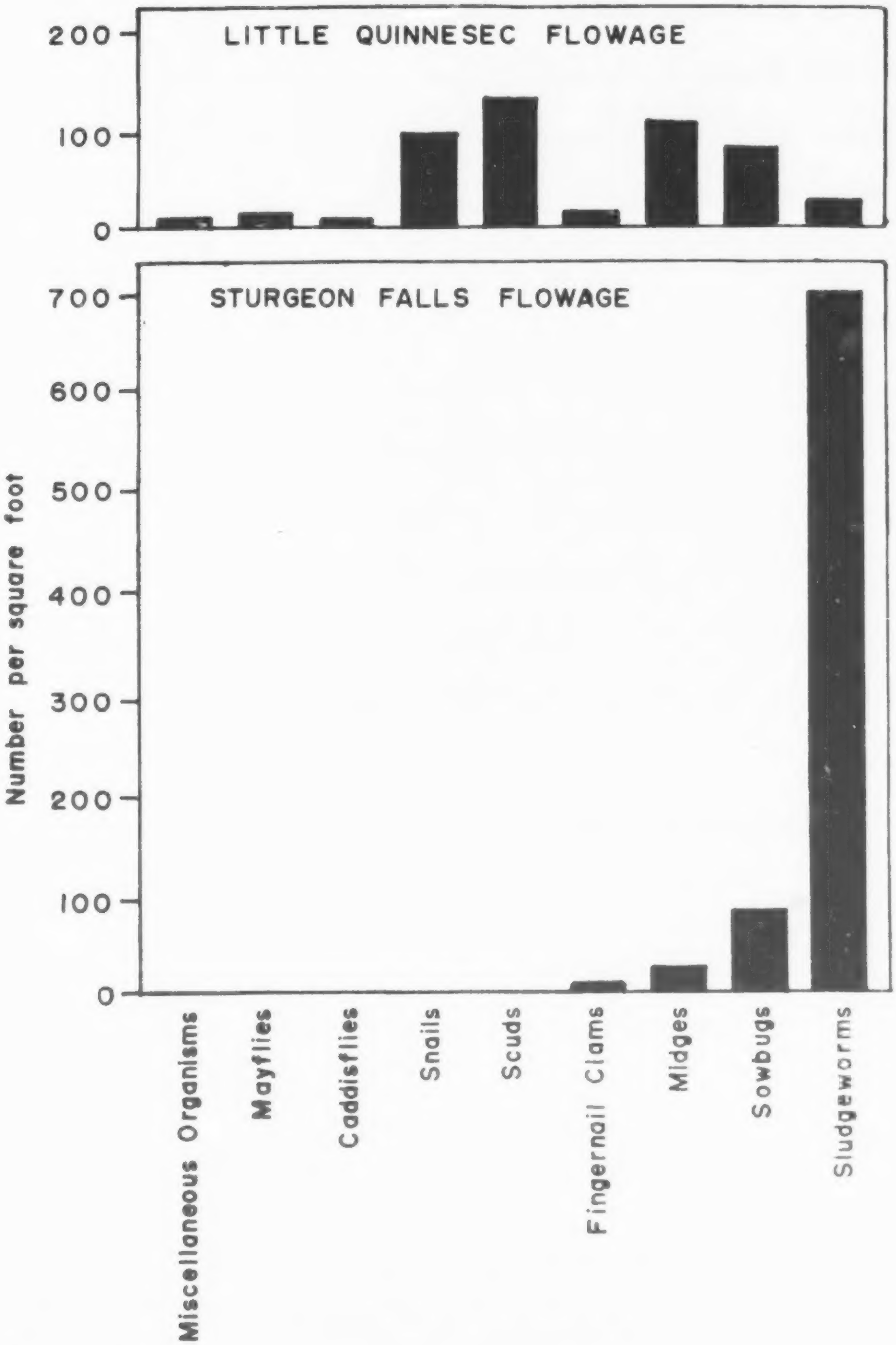
To ascertain the effect of pollution discharged at Niagara, Wisconsin, on sluggish water areas, samples were taken from Little Quinnesec reservoir above Niagara, as well as from the Sturgeon Falls reservoir about one mile above the confluence with the Sturgeon River (Figure 8). The bottom organism population found in the reservoir above Niagara is considered typical for a clean water environment. A great diversity of organisms was found. In the Sturgeon Falls reservoir, below Niagara, forms sensitive to pollution were eliminated and the sludgeworm population was drastically increased, indicating degraded bottom conditions by wastes discharged from the Niagara area. The water was definitely turbid; sludge and wood chips were found in areas of reduced current. Wood fibers and limited quantities of slime bacteria were present.

(Figure 8 is as follows:)

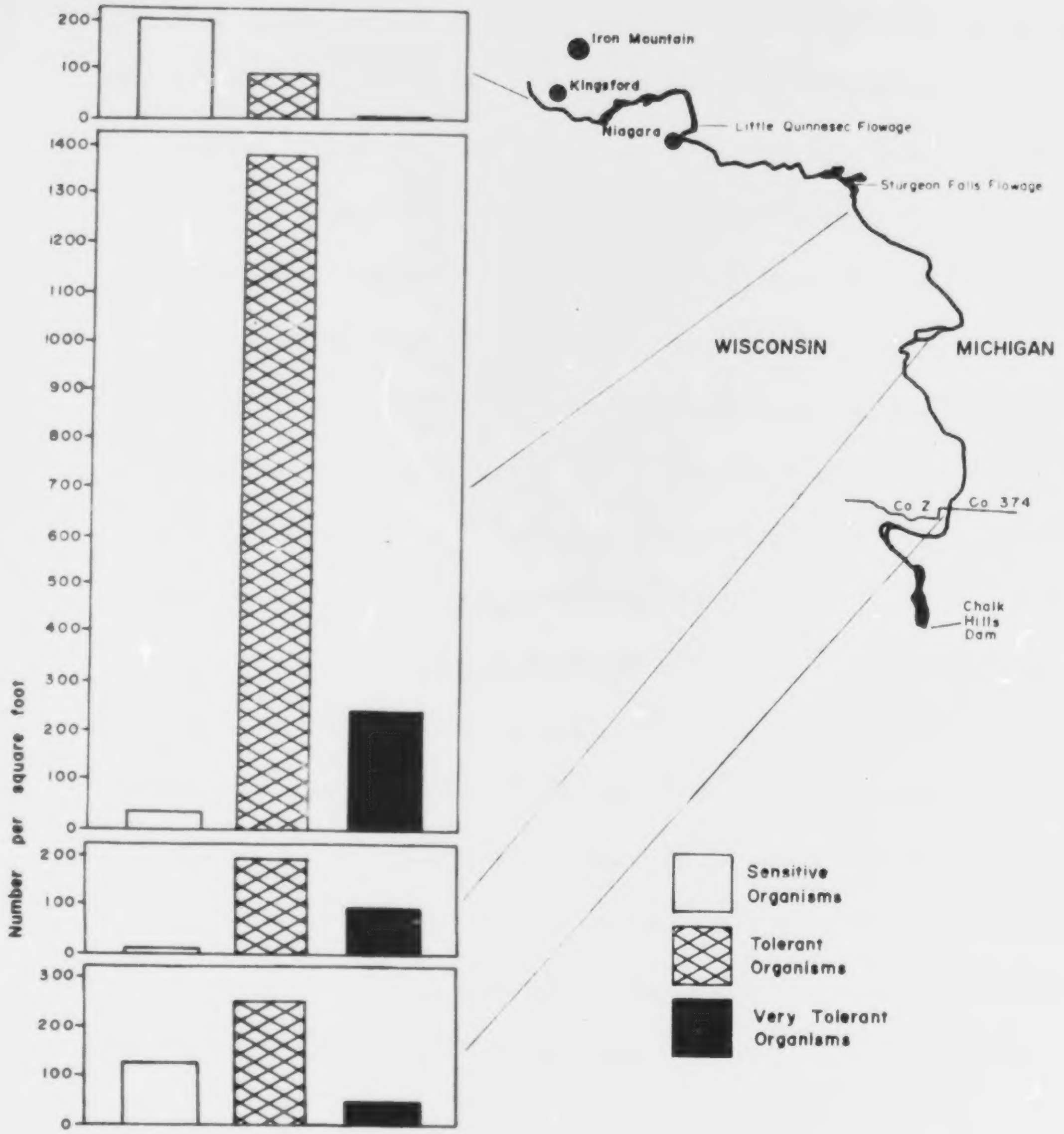
Figure 8. Comparison of bottom organism populations — upper Menominee River flowages, August, 1963.



To determine the effect of pollution arising at Niagara on organisms living in flowing water, downstream stations were compared with the flowing clean water area above Kingsford-Iron Mountain, Michigan. One-half mile below the Kimberly-Clark Corporation at Niagara, Wisconsin, slime bacteria and wood chips were observed floating downstream. The river bottom was coated with slime bacteria and fibers, and small balls of sludgeworms entwined themselves in this mass, indicating severe biological degradation. Fish food and fish spawning areas have been destroyed. Just below Pier's Gorge the rock bottom was extremely slick and was covered with a filamentous green algae, wood fibers, and slime bacteria. This substratum supported principally tolerant leeches and isopods with an occasional mayfly. Below Sturgeon Falls Dam (Figure 9), there existed a dense growth of several types of aquatic vegetation including algal streamers that reached a length of 15 to 20 feet. The bottom organism population was composed principally of a large number of tolerant forms. Sensitive forms were much reduced when compared to the clean water station above the Kingsford-Iron Mountain sewage treatment plant. Very tolerant forms were increased.

(Figure 9 is as follows:)

Figure 9. Populations of bottom organisms — upper Menominee River, August, 1963.



Samples collected about two miles above Kremlin Falls indicated similar degraded bottom conditions, however there was some reduction in tolerant forms and caddisflies made their first appearance below Niagara, indicating beginning stream recovery. Slime bacteria or wood fibers were not observed in quiet water areas, however, small wood chips were noted. At County Trunk Z a bottom dwelling community was found that is considered normal for a healthy river environment.

Conservation officers report no fishing pressure in the area below Niagara, Wisconsin, because of the polluted condition of the river. Access areas, although limited in nature, are present but currently are not being used. The access area at Kremlin Falls, however, did appear to be used at the time of the biological investigation.

The discharge of large and small wood chips from paper pulp mill operations in Niagara interferes greatly with the normal uses of the bottom substratum by bottom dwelling organisms, fish, and other aquatic life. These chips, that eventually become water-logged and sink, destroy natural homes for bottom organisms, and also serve as a substrate for the development of slime bacteria which tend to mat together masses of wood chips, fibers, and other debris, which blanket the bottom in this area and cover up fish spawning areas. As the mat becomes more extensive, it collects gases of decomposition which, on occasions, bring a mass of such material to the water surface where it is again broken up, dispersed, and often carried to a new location downstream. These solids, fibers, slimes, and floating septic sludge patches degraded the appearance of the river and reduced its esthetic appeal for general recreational use.

The Upper Menominee River is degraded from the Kimberly-Clark Corporation paper mill at Niagara, Wisconsin, to Kremlin Falls, a distance of 22 miles, by the presence of wood chips, wood fibers, and bacterial slimes which cause a decrease in the population of sensitive bottom dwelling forms and a concurrent increase in the population of tolerant and very tolerant organisms. Return to a normal clean water bottom organism population occurs near County Trunk Z bridge, some 25 miles below the mill. Solids pollution damage to the Upper Menominee River is caused principally by wastes from the Kimberly-Clark Corporation.

Coliform Bacteria

According to water quality guides and objectives used by many State and interstate pollution control agencies, waters used for swimming and water contact sports should not average more than 1,000 MPN/100 ml total coliform bacteria and those used for general recreation should not average more than 5,000 MPN/100 ml.

For example, the Ohio River Valley Water Sanitation Commission, representing 8 States, and the Engineering Section of the Missouri Basin Health Council, representing 10 States, adopted the following guide for water pollution control activities:

> "For bathing or swimming waters, monthly arithmetical average 'most probable number' of coliform organisms should not exceed 1,000 per 100 ml during any month of the recreation season; nor exceed this number in more than 20 percent of the samples examined during any such month; nor exceed 2,400 per 100 ml on any day. For non-bathing or non-swimming waters, the monthly arithmetical average 'most probable number' of coliform organisms should not exceed 5,000 per 100 ml in any month of the recreational season, nor should exceed this number in more than 20 percent of the samples examined during any such month."

Figure 10 shows the symmetrical mean total coliform and fecal coliform densities in the Upper Menominee River during the August 1963 survey. The symmetrical mean total coliform density, determined by plotting all total coliform

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tests from each station on probability paper, is the value that was equalled or exceeded 50 percent of the time.

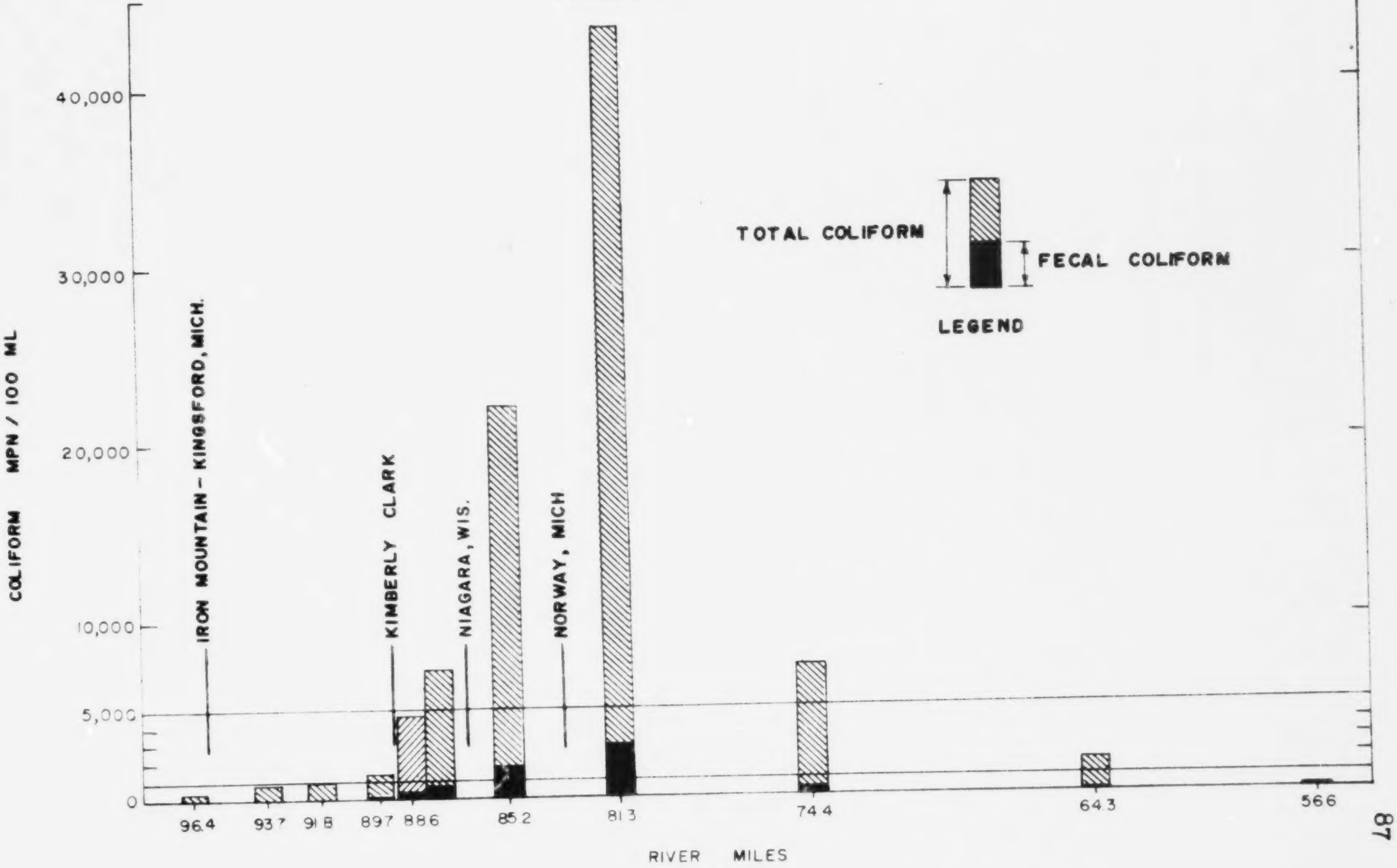
Total coliform densities increased from 340 MPN/ 100 ml above Iron Mountain-Kingsford (M-96.4) to 900 MPN/ 100 ml at the U. S Highway 2 bridge (M-91.8), some 4-1/2 miles below the treatment plant outfall. Fecal coliform concentrations increased from 21 to 60 in this same reach. Bacterial quality of the Menominee River below the Iron Mountain-Kingsford sewage treatment plant is satisfactory for swimming and general recreational use.

A local sewer, at the Highway 2 bridge, and a flume from the pulp mill hot pond enter the river above the power plant intake at the Kimberly-Clark power dam in Niagara, Wisconsin (M-89.7), where the total coliform densities increased to 1390 and fecal coliform densities increased to 97.

(Figure 10 is as follows:)

COLIFORM BACTERIA
UPPER MENOMINEE RIVER

FIGURE 10



About one mile below the Kimberly-Clark mill (M-88.6), but above the outfall from the Niagara, Wisconsin, sewage treatment plant, the total coliform densities increased to 4,600 on the Michigan side and 7,300 on the Wisconsin side of the river, and the fecal coliform densities increased to 195 and 870 at these two sampling points. This significant increase, especially in the fecal coliform count, indicates that some domestic sewage may bypass the municipal sewers and enter the river directly. This possibility should be investigated during a subsequent detailed sanitary survey of the area.

At the U. S. Highway 8 bridge (85.2), about three miles below the Niagara treatment plant outfall, wastes are mixed throughout the Michigan and Wisconsin waters of the entire stream cross section and the mean total coliform density increased to 22,100 and the fecal coliform density increased to 1,890 MPN/100 ml.

Untreated sewage from Norway, Michigan, is discharged into Sewer Creek about 2.4 miles above its confluence with the Menominee River. Sewer Creek, entering the Menominee River about two miles below the previous sampling station at the U. S. Highway 8 bridge, contained approximately 415,000 MPN/100 ml total coliform and 120,000 MPN/100 ml fecal coliform 0.6 miles above its mouth.

The symmetrical mean bacterial densities in the Menominee River increased to 43,500 total coliforms per 100 ml and 3,000 fecal coliforms per 100 ml in the pool above the Norway power dam (M-81.3), which is located about seven miles below Niagara and two miles below the entrance of Sewer Creek. At this station the arithmetic average of total and fecal coliform densities were 70,200 and 5,100 MPN/100 ml, respectively.

The Faithorn, Michigan, sampling station (M-74.4), is fourteen miles below Niagara and nine miles below Sewer Creek. Mean total coliform density at this station had declined to 7,300 per 100 ml and fecal coliforms had declined to 370 per 100 ml. Downstream from this point, the mean total coliform density declined to 1,900 per 100 ml at County Trunk Z (M-64.3) and to 130 per 100 ml at Chalk Hill Dam (M-56.6). Fecal coliform densities declined to 86 per 100 ml and less than 20 per 100 ml respectively, at these last two named stations.

Bacterial pollution, principally from Niagara, Wisconsin, and Norway, Michigan, increased coliform densities above the 5,000 MPN/100 ml level considered satisfactory for general recreational water use for a distance of 14 miles below Niagara and 9 miles below Sewer Creek. For a distance of 24 miles below Niagara and 19 miles below Sewer Creek, total coliform densities exceeded the 1,000 MPN/100 ml level considered satisfactory for water contact sports. The proportionate load from each of these sources has not been determined.

pH, Turbidity and Color

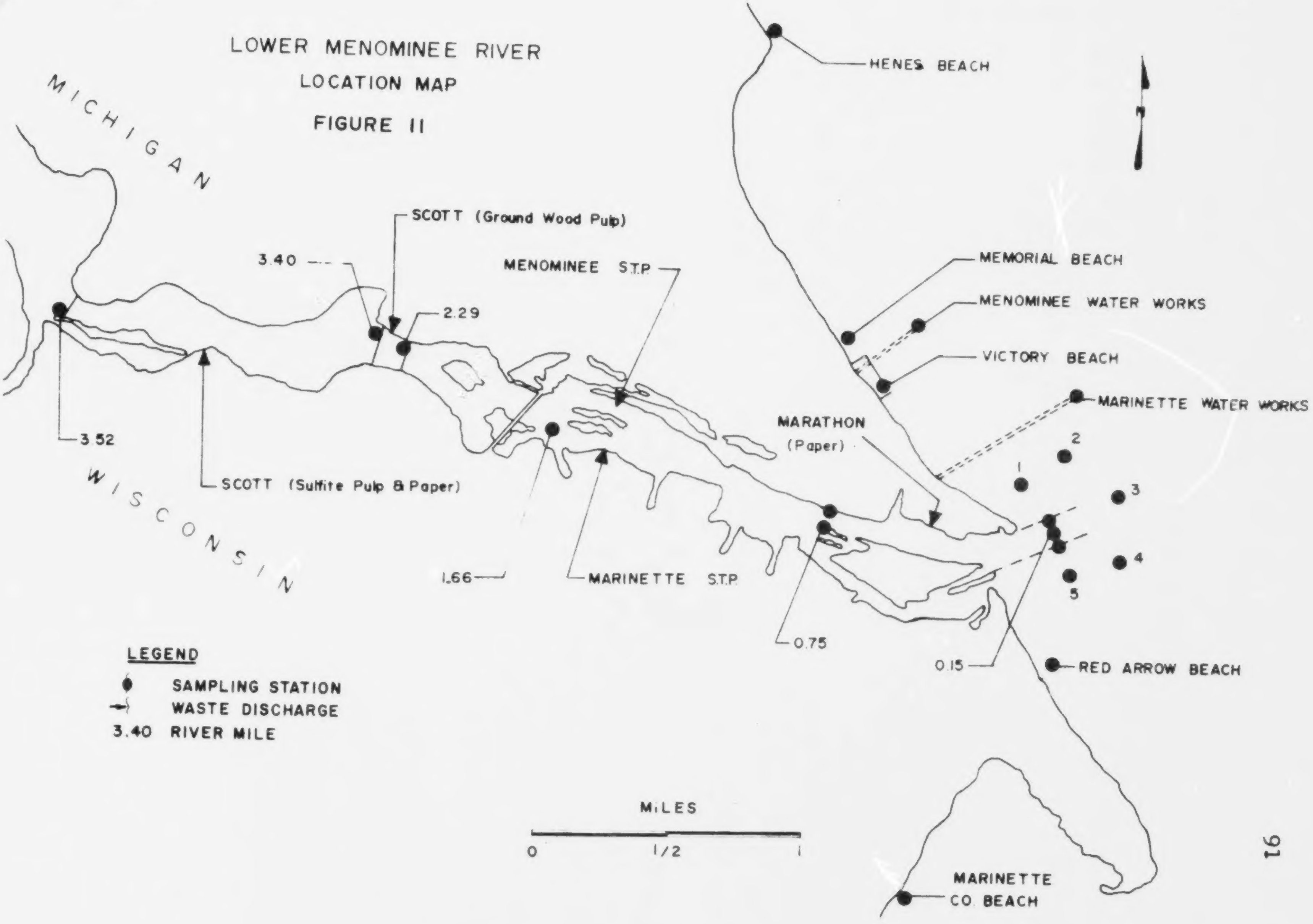
The waste discharges did not significantly alter river water characteristics measured by pH, turbidity and color.

LOWER MENOMINEE RIVER

SOURCES OF WASTES

Pulp and paper mill wastes and treated domestic sewage are discharged to the Lower Menominee in the Marinette, Wisconsin, and Menominee, Michigan, area. Wastes from the Ansul Chemical Corporation in Marinette, Wisconsin, which created problems in former years, no longer pollute the river. Location of the waste discharges and the estimated organic and solids loads are shown on Figure 11 and Table 3.

(Figure 11 and Table 3 are as follows:)



LOWER MENOMINEE RIVER
LOCATION MAP
FIGURE II

MICHIGAN
WISCONSIN
HENES BEACH
SCOTT (Ground Wood Pulp)
3.40
2.29
MENOMINEE S.T.P.
MEMORIAL BEACH
MENOMINEE WATER WORKS
VICTORY BEACH
MARINETTE WATER WORKS
MARATHON (Paper)
1
2
3
4
5
3.52
SCOTT (Sulfite Pulp & Paper)
1.66
MARINETTE S.T.P.
0.75
0.15
RED ARROW BEACH
LEGEND
● SAMPLING STATION
→ WASTE DISCHARGE
3.40 RIVER MILE
MILES
0
1/2
1
MARINETTE CO. BEACH

CORRECTED COPY
(8-24-63 Revision)

TABLE 3

SOURCES OF WASTES

Estimated Net Loads to Lower Menominee River

August, 1963

SOURCE	ORGANIC WASTES (5 Day BOD) Population Equivalents	ORGANIC WASTES (5 Day BOD) % of Total	SOLIDS WASTES (Vol. Susp. Solids) Tons/Day	SOLIDS WASTES (Vol. Susp. Solids) % of Total
SCOTT PAPER CO.(1) Marinette, Wisconsin (Fiber recovery, hauling for road binder)	197,000	80.6	3.5	38.9
MARINETTE, WISCONSIN(2) Municipal and Industrial Wastes (Primary Treatment single stage chlorination)	10,000	4.1	0.5	5.6
MENOMINEE, MICHIGAN(3) (Primary Treatment, with pre- and postchlorination)	7,300	3.0	0.3	3.3
SCOTT PAPER CO.(4) Menominee, Michigan (Fiber recovery)	4,700	1.9	2.2	24.4
AMERICAN CAN CO.(4) Marathon Div. - Paper Menominee, Michigan (Fiber recovery)	25,500	10.4	2.5	27.8
TOTAL -	244,500	100.0	9.0	100.0

---

(1) Calculated from production figures from Scott and unit loss value from Wisconsin survey data.

(2) P.E. from 1963 rough draft for Revised 1960 Summary Report. Solids calculated from P.E. estimates and avg. reductions.

(3) P.E. from 1963 rough draft for Revised 1960 Summary Report. Solids from plant data.

(4) Calculated from production figures from Scott and American Can; and unit losses from Michigan 1963 surveys.

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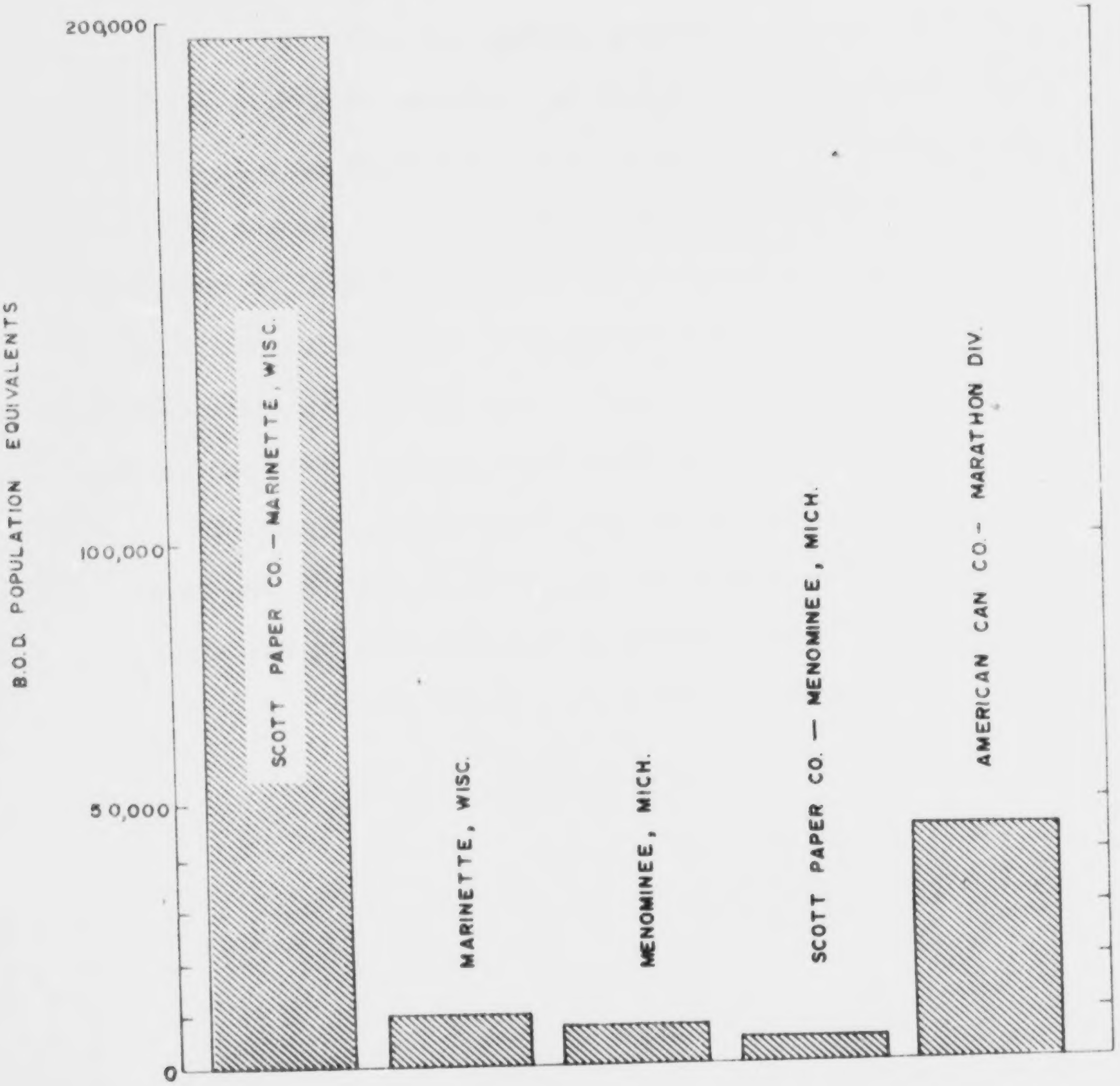
As shown on Figure 12, 81 percent of the organic waste (5-Day B.O.D.) is discharged by the Scott Pulp and Paper mill in Marinette and 10 percent by the Marathon Division of American Can Company in Menominee. The other 9 percent represents the combined discharges from the Scott groundwood mill in Menominee and the Menominee, Michigan, and Marinette, Wisconsin, sewage treatment plants. Of the total 244,500 P.E., 197,000 are discharged by the Scott Mill in Marinette and 25,500 from the Marathon mill in Menominee.

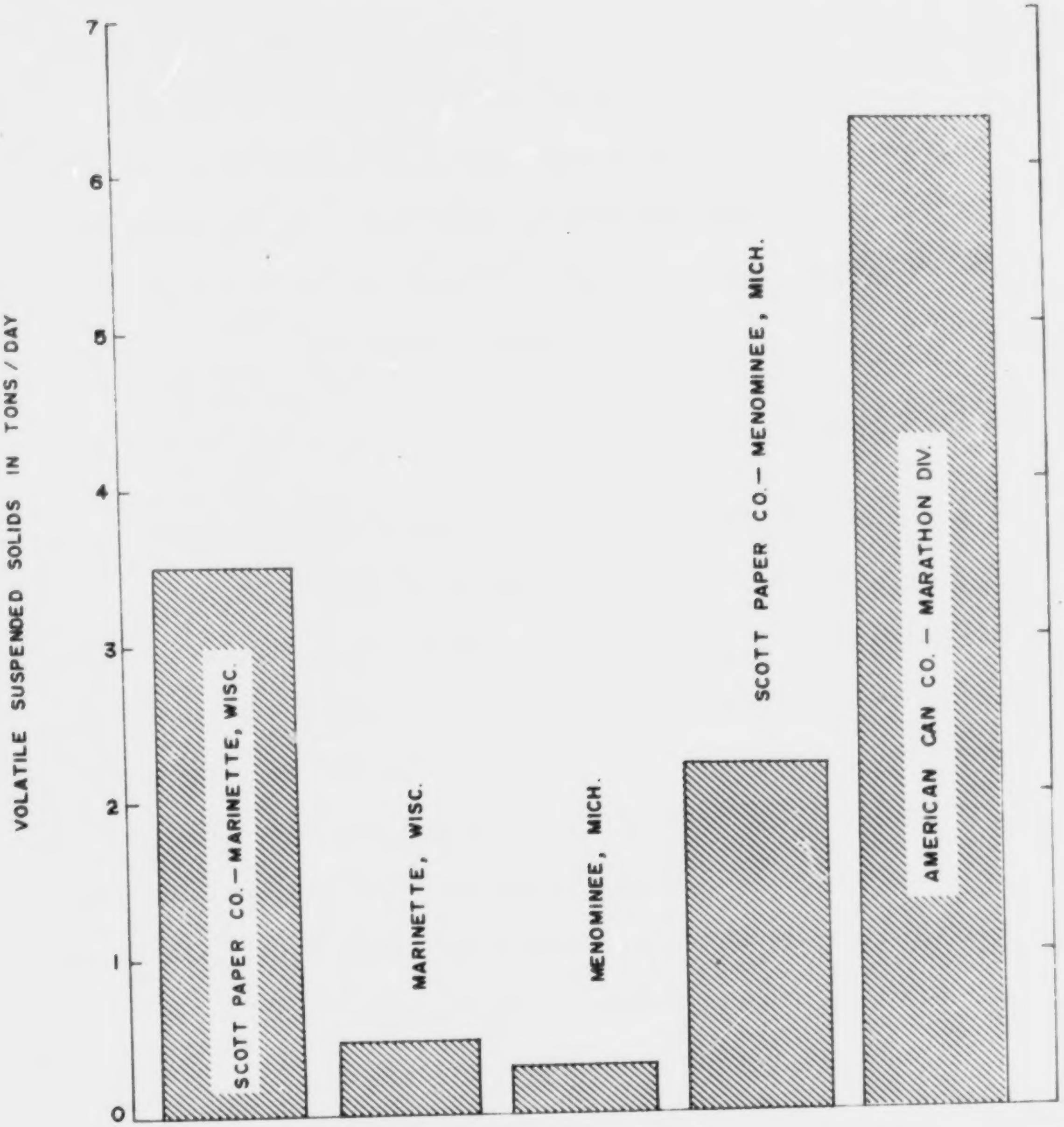
As shown in Figure 13, 91 percent of the solids are discharged by the pulp and paper mills and the remaining 9 percent by the sewage treatment plants. Of the 9.0 tons per day total approximately 2.5 tons of volatile suspended solids per day, or 28 percent, came from the Marathon paper mill, 3-1/2 tons or 39 percent, from the Scott mill in Marinette, and 2.2 tons per day or 24 percent of the total from the Scott Paper Company groundwood mill in Menominee.

(Figures 12 and 13 are as follows:)

SOURCES OF WASTES
B.O.D. POPULATION EQUIVALENTS
LOWER MENOMINEE RIVER
FIGURE 12



SOURCES OF WASTES
VOLATILE SUSPENDED SOLIDS
LOWER MENOMINEE RIVER
FIGURE 13



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EFFECTS ON WATER QUALITY

5-day Biochemical Oxygen Demand (B.O.D.)

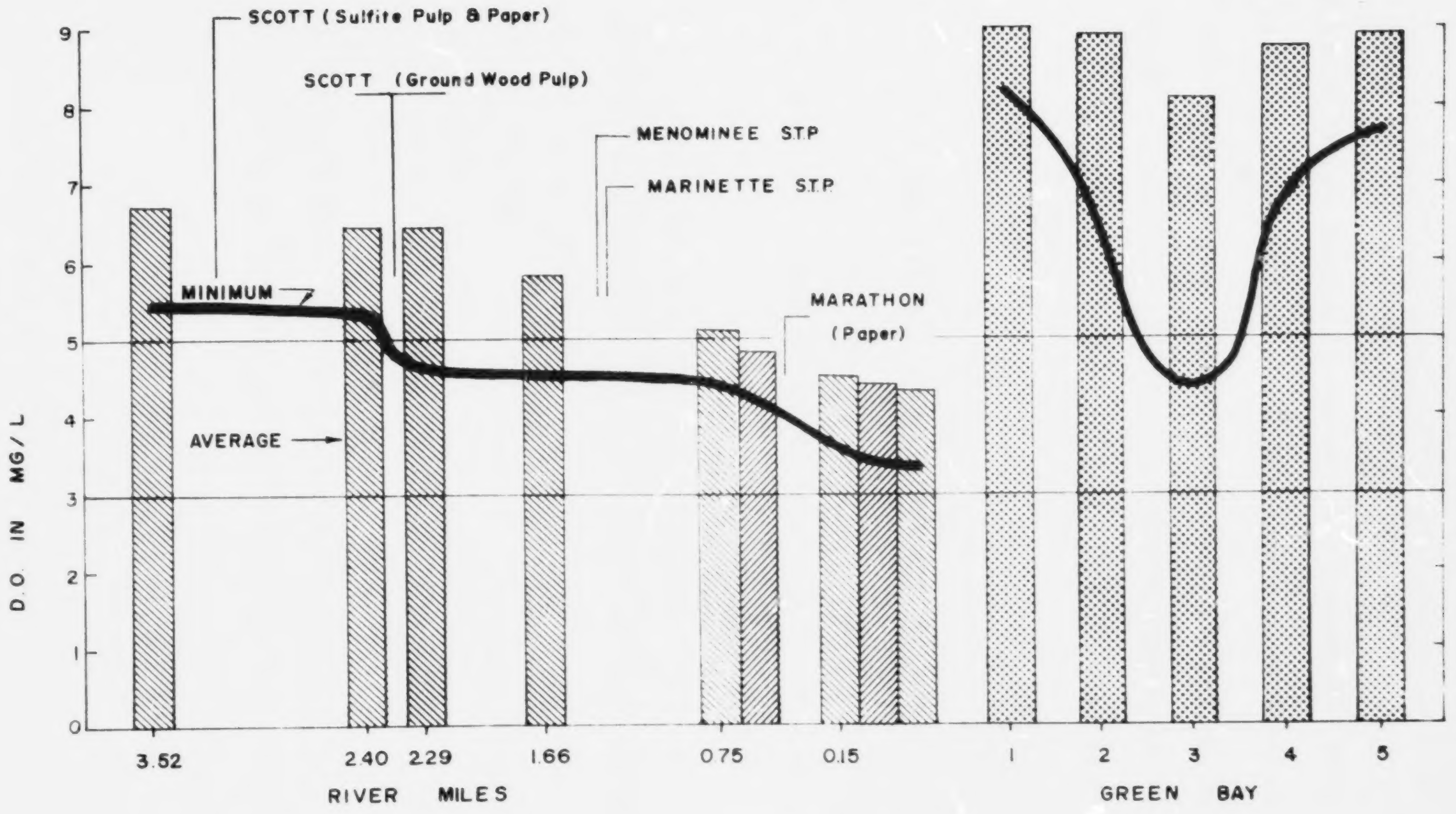
BOD's in the impoundment above the upper dam (M-3.52) averaged 1.1 mg/1. The BOD increased to 5.3 at the Hattie Street bridge (M-2.29) below the Scott mills and averaged 5.1 below the sewage treatment plants (M-0.75). An average of 4.7 was observed in the channel at the mouth of the river below Marathon (M-0.15) and the BOD's ranged from 1.1 to 1.7 in the five stations in Green Bay.

Dissolved Oxygen (DO)

The average dissolved oxygen concentrations in the Lower Menominee River are shown on Figure 14. The dissolved oxygen averaged 6.7 above the waste sources (M-3.52), 5.8 below the Scott mills (M-1.66), 5.0 below the sewage treatment plants (M-0.75), and 4.4 below the Marathon paper mill (M-0.15), and ranged from 8.1 to 9.0 in the five stations in Green Bay. The minimum values were 3.6 between the sewage treatment plants and the Marathon mill, and 3.4 in the channel at the mouth below the Marathon mill.

(Figure 14 is as follows:)

DISSOLVED OXYGEN
LOWER MENOMINEE RIVER
FIGURE 14



The organic waste loadings to the lower Menominee River depressed the average dissolved oxygen concentrations below 5.0 mg/l near the mouth of the river, but the minimum dissolved oxygen concentrations remained above the 3 mg/l level considered critical to fish life by the State of Wisconsin.

Arsenic and Chlorides

River waters were analyzed for arsenic and for chlorides to evaluate the effects of wastes discharged from the Ansul Chemical Company. River samples, collected both above and below the chemical company waste discharge contained from 2 to 5 mg/l of chlorides, and less than .001 mg/l of arsenic. The survey data did not indicate pollution of the Lower Menominee River by wastes from the Ansul Chemical Company.

pH, Alkalinity, Hardness, and Color

The waste discharges did not significantly alter river water characteristics measured by pH, alkalinity, hardness, and color.

Total Suspended Solids

Average suspended solids concentrations in the river increased from 6.1 mg/l above the upper dam (M-3.52) to 8.9 mg/l at the Hattie Street bridge (M-2.29) below the Scott mills. Samples collected from the station between the sewage treatment plants and the Marathon paper mill (M-1.66) averaged 4.75 and increased to 5.3 at the mouth below the Marathon mill (M-0.15). Except for a 6.2 value at the northeasterly sampling station, samples collected from 4 out of 5 of the Green Bay stations averaged 3.3 mg/l.

The above averages represent 26 samples collected twice daily at each station. On Wednesday, August 8th, 1963, the morning and noon samples from each of the two sample stations (M-2.29 and M-1.66) located between the Scott groundwood mill and the sewage plant outfalls increased sharply to 40 mg/l suspended solids in the morning and 25 mg/l about noon.

Coliform Bacteria

The symmetrical mean total coliform densities (Figure 15) increased from 400 MPN/100 ml above the upper dam (M-3.52) to 2,000 at the Hattie Street bridge (M-2.29) below the Scott paper mills and 2,600 in the river above the sewage treatment plant outfalls (M-1.66). Total coliform densities increased to 6,000 MPN/100 ml in the reach between the treatment plant outfalls and the Marathon paper mill (M-0.75). In the channel at the mouth of the river (M-0.15), the symmetrical mean increased to 8,500 MPN/100 ml and the arithmetic average was 15,200 MPN/100 ml.

Effluent from the Menominee, Michigan, sewage treatment plant contained about 900 total coliform/100 ml. Effluent from the Marinette, Wisconsin sewage treatment plant enters the river through two outfalls which contained 7,600 and 260,000 coliforms per 100 ml respectively.

Total symmetrical mean coliform densities in the river below the sewage treatment plant outfalls increased slightly above the 5,000 MPN/100 ml level considered satisfactory for general recreational use. The survey data indicated that the effluents from the Marinette, Wisconsin, sewage treatment plant were the principal sources of bacterial pollution.

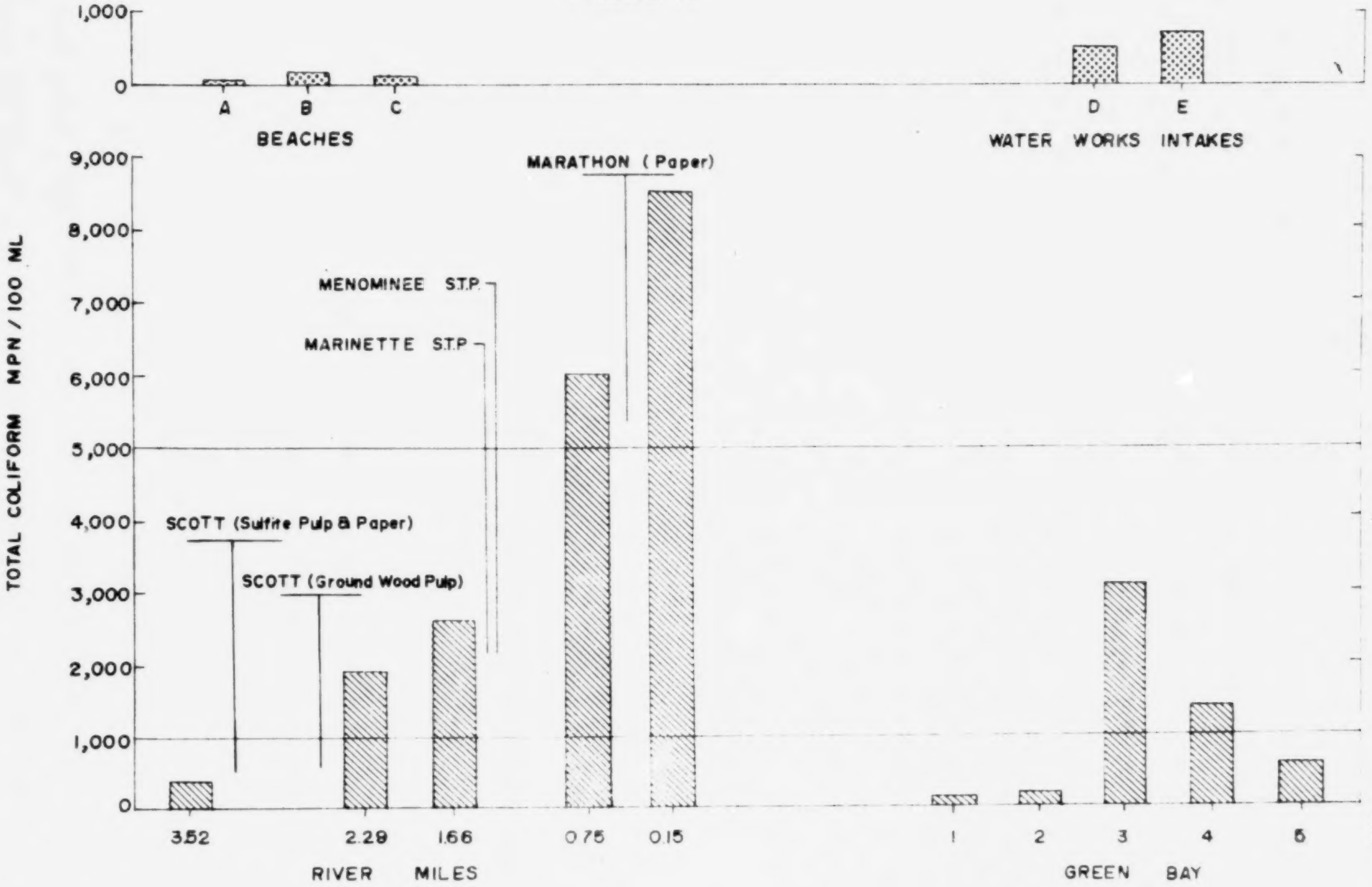
As shown on Figure 15, the symmetrical mean coliform density in the Green Bay stations clustered around the river mouth, amounted to 3,000 MPN/100 ml at the station just outside the mouth and 1,400 and 600 MPN/100 ml at the two southerly sampling stations. The coliform densities were 175 and 138 respectively at the two northerly sampling stations.

(Figure 15 is as follows:)

COLIFORM BACTERIA

LOWER MENOMINEE RIVER

FIGURE 15



Symmetrical mean coliform densities at the two municipal water works intakes and the five municipal swimming beaches ranged from about 70 to 700 MPN/100 ml. Bacterial pollution of the Lower Menominee River is reduced by dilution and natural purification as these waters flow into Green Bay. Water quality, as measured by the coliform tests, was satisfactory at the bathing beaches and the water works intakes in Green Bay during the survey.

BIOLOGY

Past Studies

The 1961 Wisconsin report states that the bottom biota was normal for the physical conditions encountered above the upper dam in Marinette. Polluted conditions were found below the interstate Highway 41 bridge with wood fibers, wood chips, and slime bacteria covering the bottom deposits. Near Ansul Chemical Company, bottom conditions were degraded to such an extent that no biota were encountered in the samples collected. Long wood fibers, bark, and slime bacteria were found intermingled in the bottom sludge and deposited over those areas of natural sand bottom.

A report by the Michigan Water Resources Commission, dated August 24, 1961, discusses fish taste tests performed on Menominee River fish in the region of Menominee-

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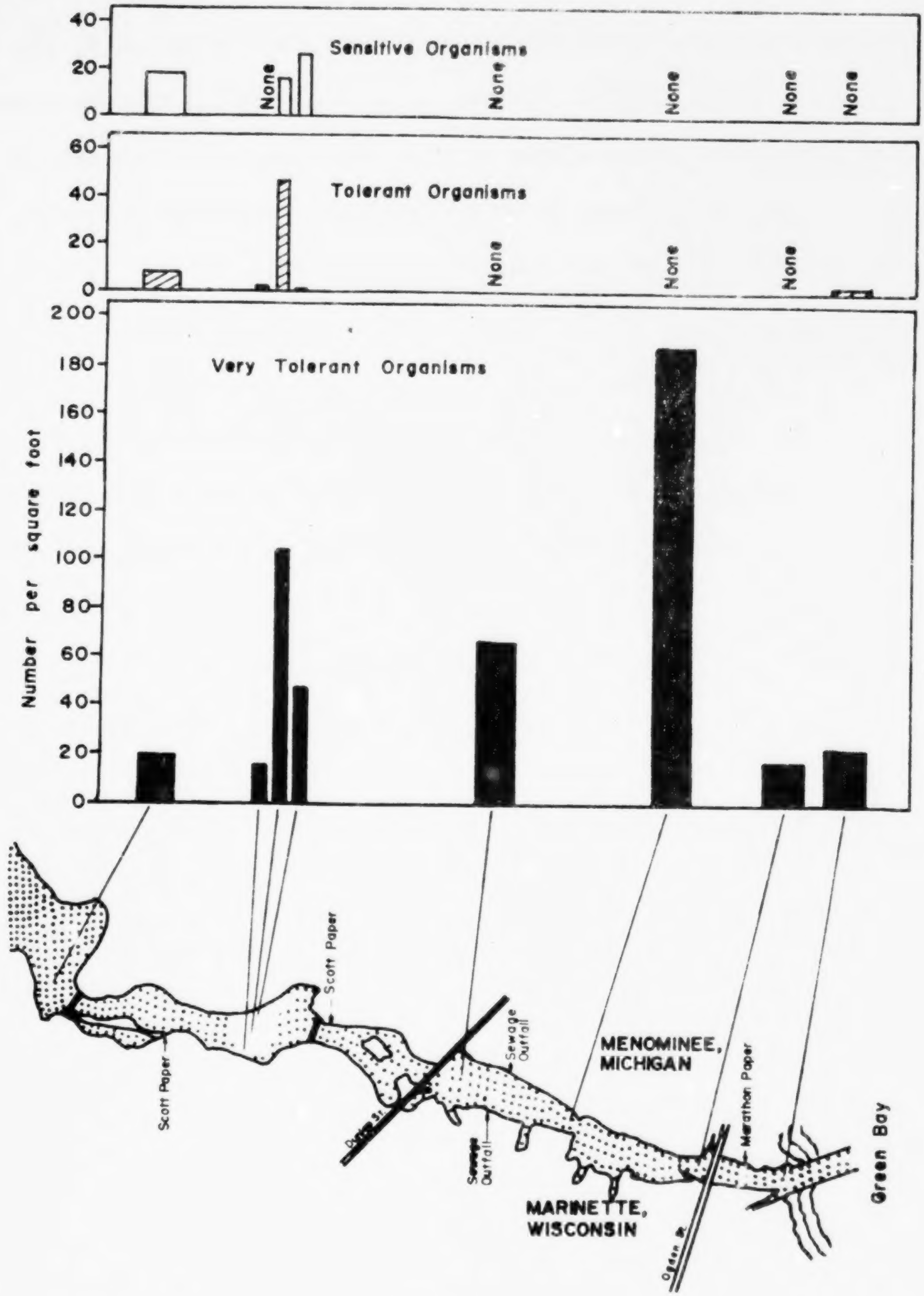
Marinette. Of six Menominee River walleyes tasted, one was judged as good, two as fairly good, one just acceptable, and two as non-acceptable. Conservation officers in both Michigan and Wisconsin indicate that complaints have been received on off-flavor in fish caught from the Lower Menominee River in the reach polluted with paper mill effluent.

Current Biological Data

Bottom samples on the Lower Menominee River, in the vicinity of Menominee, Michigan - Marinette, Wisconsin, were taken from just above the upper dam to the mouth of the river (Figure 16).

(Figure 16 is as follows:)

Figure 16. Populations of bottom organisms—lower Menominee River, August, 1963.



A bottom dwelling community normally associated with an unpolluted flowage habitat was found at the upstream sampling site. Below the Scott Paper Company, Marinette, Wisconsin, but above the lower dam, samples across the river showed a drastic change in bottom life between the Wisconsin side receiving effluent from the mill, and the Michigan side. On the Wisconsin side, accumulated sludge deposits were composed of wood chips, fibers, and slime bacteria. On occasion, masses of this material would boil to the surface of the water, create unsightly conditions, gradually disperse, and float downstream to reform a sludge deposit. Bottom dwelling organisms were limited only to very tolerant forms, and because of adverse bottom conditions, these occurred in small numbers, indicating very polluted conditions. Near the center of the river very tolerant sludgeworms and midges attained high populations, but at the same time, sensitive burrowing mayflies were able to exist in a population of 15 per square foot. This zone of the river may be termed moderately polluted. On the Michigan side of the river, the bottom organisms population was quite similar to that encountered above the upper dam - a clean water area.

Below the lower dam, bottom samples indicated mixing of the mill wastes across the river, in both Michigan and Wisconsin waters. Wood fibers and slime bacteria were found intermingled with bottom deposits to the river's mouth. Only very tolerant organisms were able to survive severely degraded bottom conditions in this environment. The population of these was increased below the sewage treatment plant outfalls, because of the increased food supply, and diminished near the mouth of the river because of septic bottom conditions. Samples below Marathon Paper Company revealed extensive sludge deposits and few organisms because of severely polluted conditions. Floating solids were present. On the Wisconsin side at this point the sludge had a strong hydrogen sulfide odor and contained yellow particles of elemental sulphur. A sulphur pile was noted on the docks upstream.

The Menominee River is degraded below the Scott Paper Company at Marinette, Wisconsin, to its mouth, a distance of three miles, as indicated by the presence of wood chips, wood fibers, and slime bacteria, and the elimination of sensitive bottom dwelling organisms. Near the river's mouth, bottom conditions were so polluted that only a few organisms of any type could survive. Fish food has been eliminated.

Marina operators reported that solids and slimes in the river foul motor boat cooling systems. Suspended solids, fibers, bacterial slimes and patches of floating septic sludge degraded the appearance of the river and reduced the esthetic appeal of the Lower Menominee River for general recreational use.

BRULE RIVER

SOURCES OF WASTES

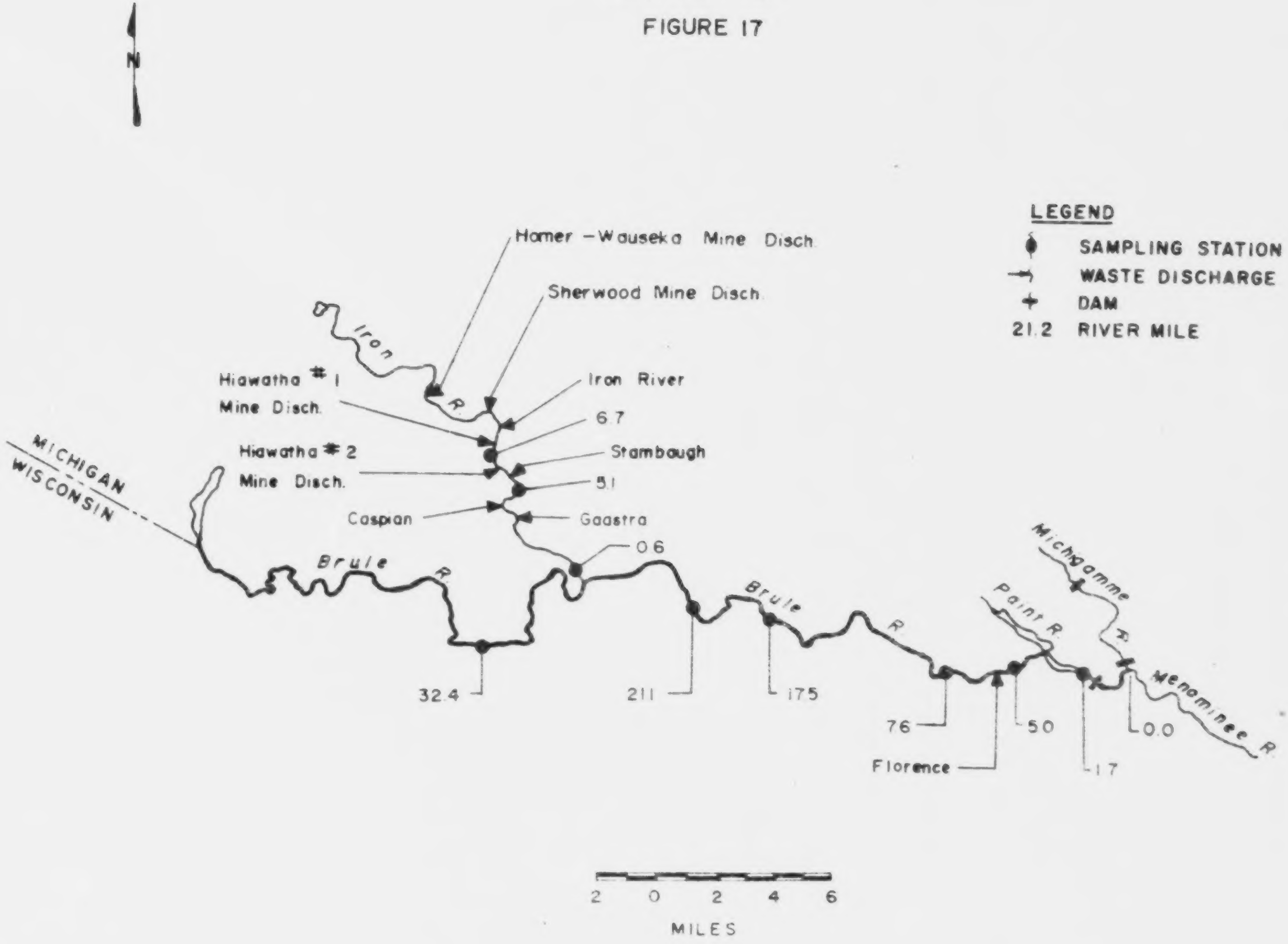
Throughout a distance of about 10 miles from the mouth, drainage from four iron mines and the effluents from four municipal sewage treatment plants enter the Iron River and flow southeasterly into the interstate waters of the Brule River. A fifth municipal sewage treatment plant discharges near the mouth of the Brule. Location of the waste discharges and the estimated waste loads are shown on Figure 17 and Table 4.

(Figure 17 and Table 4 are as follows:)

BRULE RIVER

LOCATION MAP

FIGURE 17


N
LEGEND
SAMPLING STATION
WASTE DISCHARGE
DAM
21.2 RIVER MILE
Homer -Wauseka Mine Disch.
Sherwood Mine Disch.
Iron R
Iron River
Hiawatha # 1 Mine Disch.
6.7
Hiawatha # 2 Mine Disch.
Stambaugh
5.1
Caspian
Gaastra
0.6
MICHIGAN
WISCONSIN
Brule R
32.4
21.1
Brule R
17.5
7.6
Florence
5.0
1.7
0.0
Paint R.
Michigamme R.
Menominee R.
2 0 2 4 6
MILES

reduced the esthetic appeal of the Lower Menominee River for general recreational use.

BRULE RIVER

SOURCES OF WASTES

Throughout a distance of about 10 miles from the mouth, drainage from four iron mines and the effluents from four municipal sewage treatment plants enter the Iron River and flow southeasterly into the interstate waters of the Brule River. A fifth municipal sewage treatment plant discharges near the mouth of the Brule. Location of the waste discharges and the estimated waste loads are shown on Figure 17 and Table 4.

(Figure 17 and Table 4 are as follows:)

BRULE RIVER

LOCATION MAP

FIGURE 17

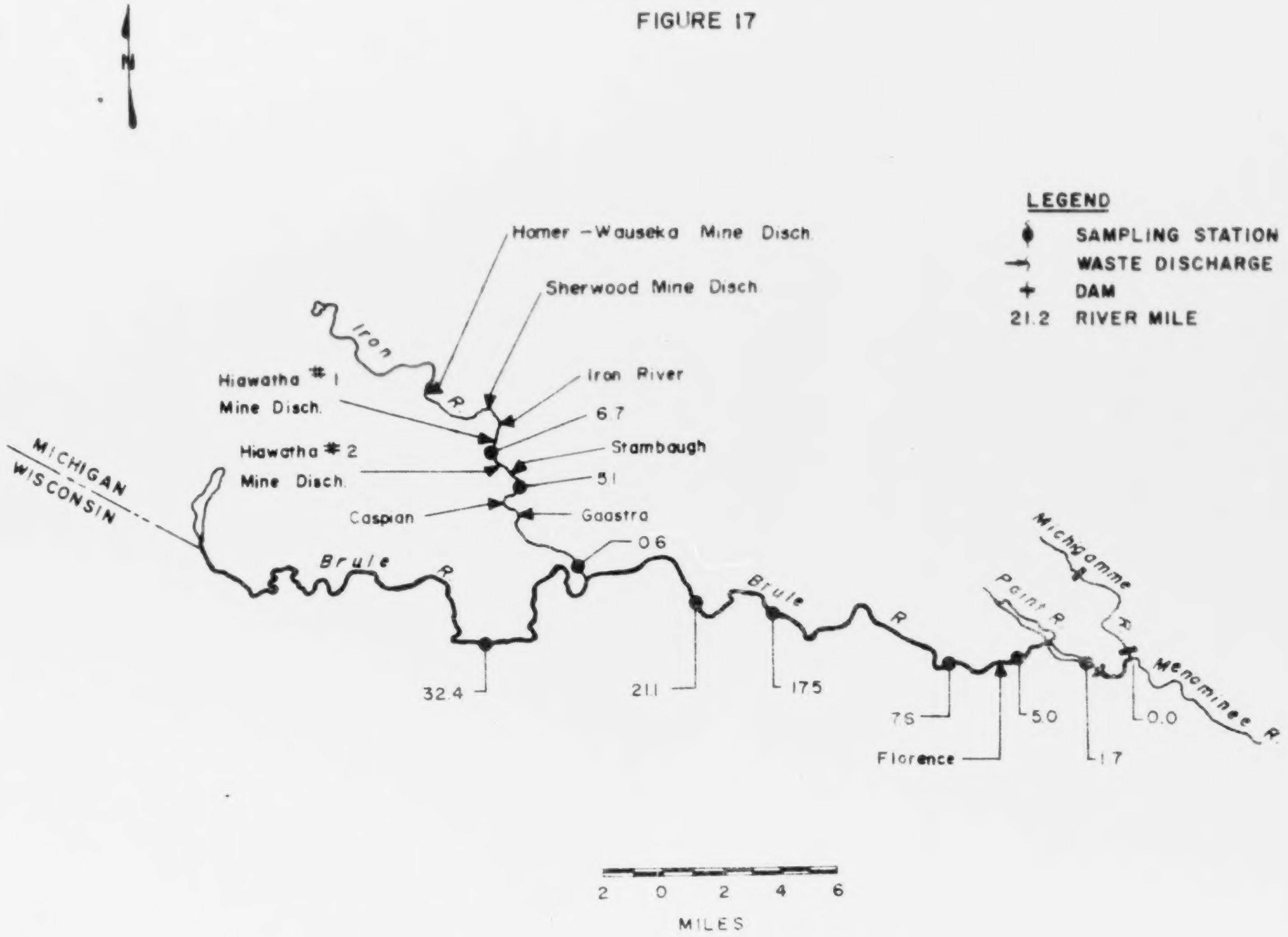

N
LEGEND
● SAMPLING STATION
→ WASTE DISCHARGE
+ DAM
21.2 RIVER MILE
Homer -Wauseka Mine Disch.
Sherwood Mine Disch.
Iron R.
Iron River
Hiawatha #1 Mine Disch.
6.7
Stambaugh
Hiawatha #2 Mine Disch.
5.1
Caspian
Gaastra
0.6
MICHIGAN
WISCONSIN
Brule R.
32.4
21.1
Brule R.
17.5
7.5
Florence
5.0
Paint R.
1.7
Michigamme R.
0.0
Menominee R.
2 0 2 4 6
MILES

TABLE 4

SOURCES OF WASTES

Estimated Loads to the Tributaries of the Brule River

August, 1963

SOURCE	ORGANIC WASTES (5-Day BOD)	
	Population Equivalents	% of Total
DOMESTIC WASTES		
Iron River, Michigan(1) (Primary Treatment with chlorination)	1,400	42
Stambaugh, Michigan(1) (Secondary Treatment with chlorination)	140	4
Caspian, Michigan(2) (Primary Treatment - Imhoff Tank)	1,040	31
Gaastra, Michigan(2) (Primary Treatment - Septic Tanks)	465	14
Florence, Wisconsin(2) Domestic + Cheese Plant Wastes. (Secondary Treatment - Stabilization Pond)	300	9
	3,345	100
IRON MINE DEWATERING(3)		
Homer-Wauseca Mine	-	-
Sherwood Mine	-	-
Hiawatha #1 Mine	-	-
Hiawatha #2 Mine	-	-

---

(1) Data from Aug. of 1962 Sewage Treatment Plant Reports.

(2) P.E. from 1963 rough draft for Revised 1960 Summary Report.

(3) Acid Iron-Bearing Mine Wastes cannot be equated in terms of BOD Population Equivalents. Amount of Iron and Acid not measured at Source.

EFFECTS ON WATER QUALITY

Iron

Gross pollution of the Iron and Brule River by acid mine drainage from the Homer-Wauseca Mines in 1962 has been corrected.

Although the severe damaging effects of 1962 have been minimized, the August 1963 waste discharges from the four mines still caused some turbidity in the stream. Turbidity of the upper Brule above Iron River (B-32.4) never exceeded 5 units. Turbidity in the mouth of the Iron River ranged from 20 to 50 for an average of 36. For a distance of 22 miles below this point the turbidity of the Brule River ranged from 14 to 18 units. After settling in the Brule Island Dam impoundment (B-1.7), turbidities again fell to 5 units.

This moderate increase in the turbidity and iron content of the Brule River was caused by iron bearing acid mine drainage from the Homer-Wauseca, Sherwood, Hiawatha #1 and Hiawatha #2 mines discharged into the Iron River. Efforts to reduce the amount of iron and turbidity introduced into the Brule River from these sources should be continued.

Dissolved Oxygen (DO)

The average dissolved oxygen concentration of the

Brule River ranged from 8 to 10 mg/1. These high dissolved oxygen values show that neither the organic content of the treated sewage nor the ferrous iron of the mine wastes caused excessive oxygen depletion.

Coliform Bacteria

The Symmetrical mean total coliform and fecal coliform densities in the Brule River during the August 1963 survey are shown on Figure 18.

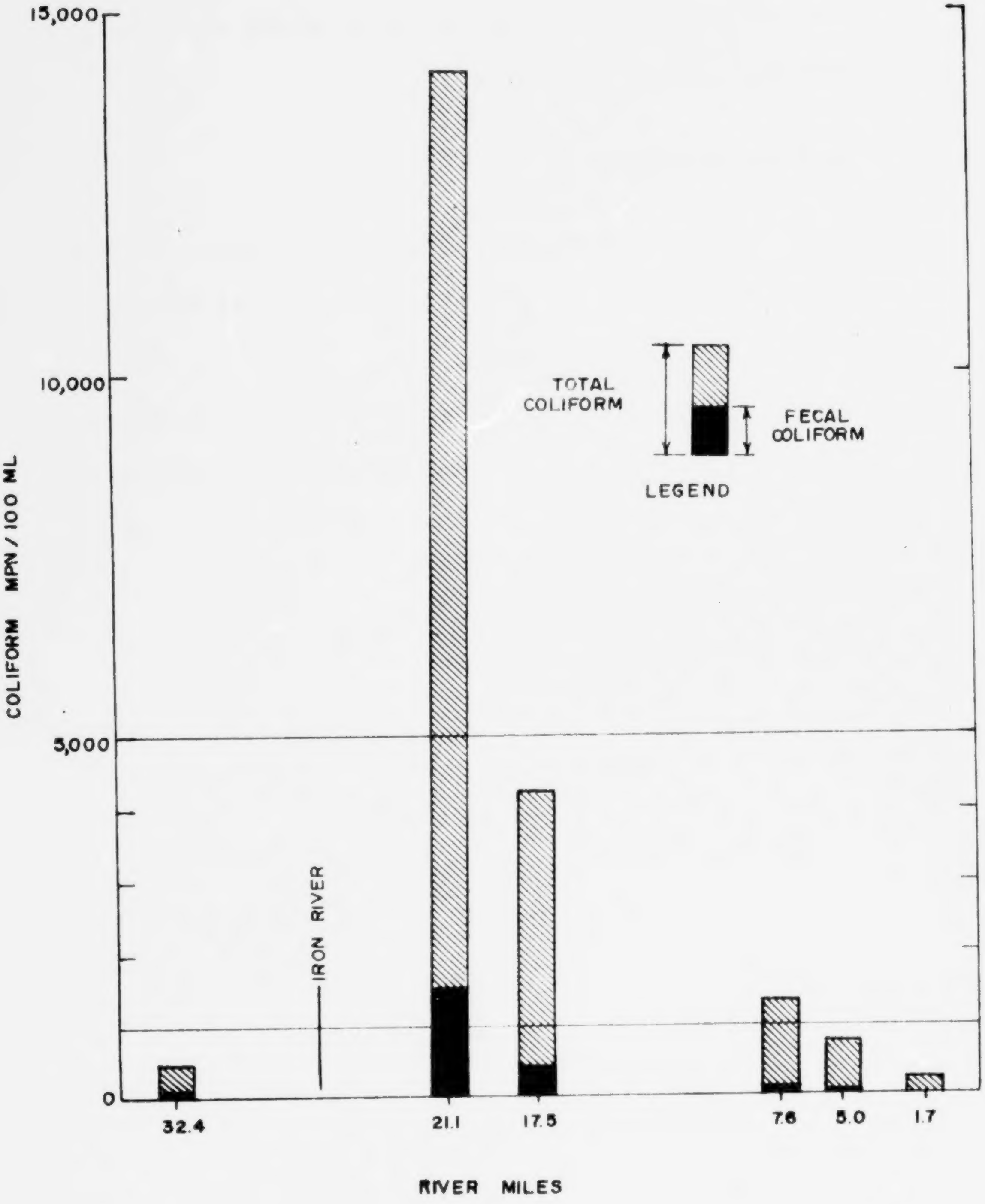
Six miles above the mouth of the Iron River (B-32.4), the Brule River contained a symmetrical mean density of 395 MPN/100 ml total coliforms and 55 MPN/100 ml fecal coliforms.

(Figure 18 is as follows:)

COLIFORM BACTERIA

BRULE RIVER

FIGURE 18



Four communities, namely, Iron River, Stambaugh, Caspian and Gaastra, discharge sewage, after varying degrees of treatment, to the Iron River in the reach from 5 to 8 miles above its junction with the Brule River. The Iron River contained 47,500 MPN/100 ml total coliforms and 7,900 MPN/100 ml fecal coliforms at the sampling station 0.6 miles above its junction with the Brule River. At this station, the arithmetic average total and fecal coliform densities amounted to 89,900 and 10,320 MPN/100 ml respectively. The proportionate amount of this coliform load discharged by each one of these four communities was not determined.

Maximum bacterial pollution in the Brule River was observed at river mile 21.1, some 5 miles below the mouth of the Iron River, where the symmetrical mean total coliform density increased to 14,200 and the fecal coliform increased to 1,500 MPN/100 ml. At this station the arithmetic average total and fecal coliform densities were 18,230 and 1,920 MPN/100 ml respectively.

Nine miles below the Iron River (B-17.5), the total coliform density decreased to 4,250 and the fecal coliform density decreased to 430. At this station, and downstream, the coliform densities were below the level considered satisfactory for general recreational use. Twenty-two miles below the junction with Iron River (B-5.0), the total coliform density decreased to 720 which meets the bacterial objective for swimming water quality.

The survey data, illustrated on Figure 18, show that bacterial discharges into the Iron River increased the symmetrical mean coliform densities in the Brule River materially above the 5,000 level considered satisfactory for general recreational purposes, and polluted the interstate waters of the Brule River for a distance of more than five and most probably about eight miles.

A more detailed survey of this local area, including bacteriological analysis of the sewage discharges and purification efficiencies at the treatment plants, should be conducted to establish the proportionate amount of bacterial pollution from each of these four sources and the treatment modifications that may be necessary to safeguard the recreational value of the Brule River.

Biology

The population of bottom dwelling organisms was investigated on the Iron and Brule Rivers during August 7-8, 1963. At all selected stations the substratum was rock, rubble, and gravel with occasional patches of sand. The current was swift and the water depth ranged from 6 inches to 2 feet in most areas sampled.

Biological investigation of the Iron River extended from the U. S. Forest Service Road 137 above the entrance of mine drainage, down to its junction with the Brule River. At the upstream station, brook trout were noted in the pool areas, several kinds of higher aquatic plants were abundant, fresh water sponge was growing on many of the rocks, and bottom organisms were composed of those groups normally associated with clean water.

Below Sunset Creek, which carries the Homer-Wauseca mine drainage into the Iron River, a dense floc existed in the quiet water areas while the bottom beneath the swifter water was cemented by the iron deposits, thus eliminating the many living spaces normally inhabited by stream organisms. A tremendous upsurge in the growth of a filamentous green algae produced a drastic change in the population structure of bottom organisms. The population of some types, living in close association with the dense algal growth, increased tremendously. Other forms that strain their food from the water as it passes over riffle areas were practically eliminated.

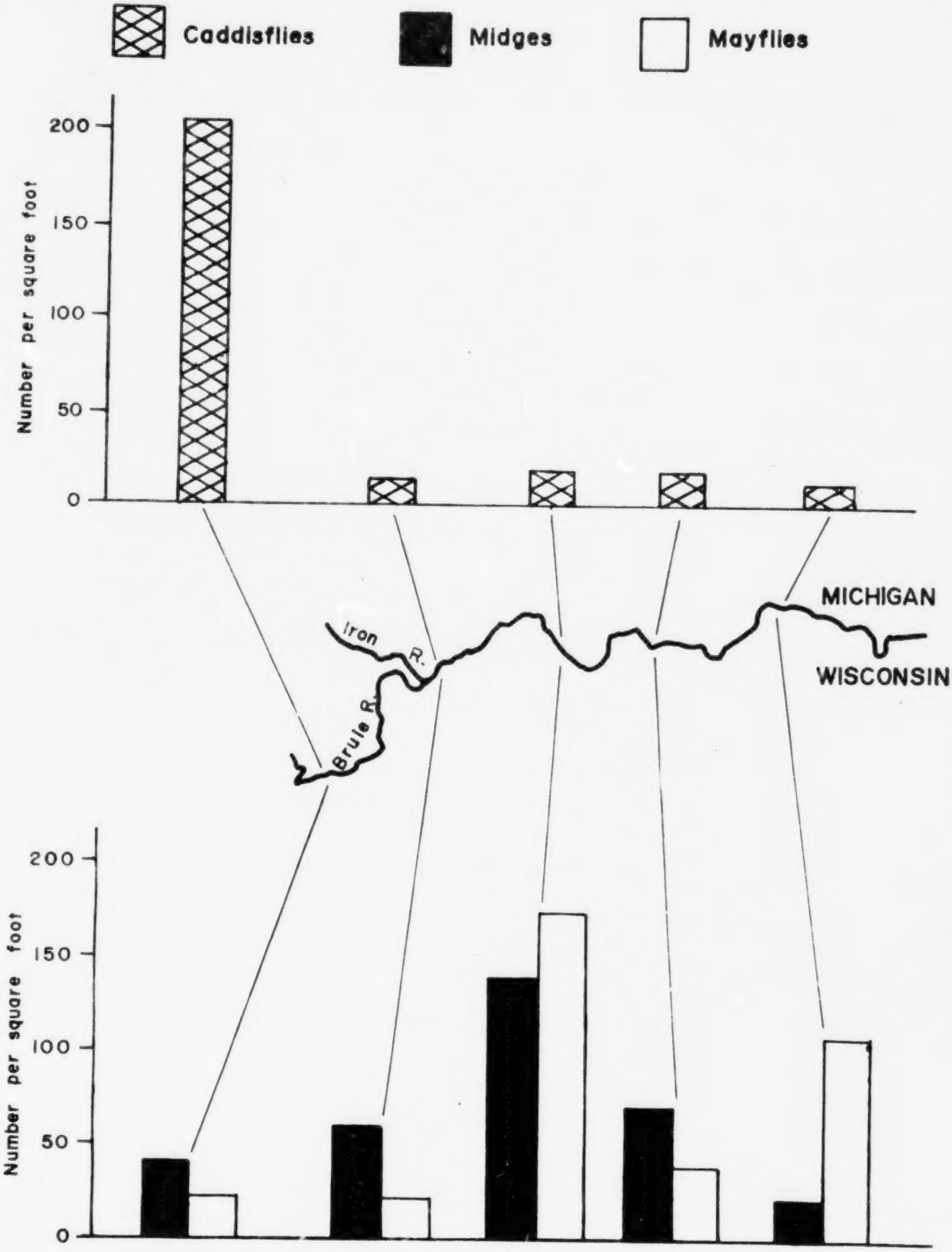
Just south of Caspian, Michigan, and again just above the junction of the Iron River with the Brule, the cementing of the rock, rubble, and gravel substratum was more pronounced; the hard deposit varied in thickness up to 3/8 inches. The filamentous green algae was abundant, and the population of bottom organisms was very low. A total of 438 organisms per square foot was found at the station above Sunset Creek, compared to only seven organisms per square foot in the Iron River just above its confluence with the Brule, indicating a severely degraded bottom environment at the latter station.

Benthic samples on the Brule River were collected from the Wisconsin 139 - Michigan 189 bridge, above Iron River, to just above McGovern's Creek some 20 miles downstream. Bottom organism populations typically associated with clean water and including an abundance of insect larva, such as stoneflies, riffle beetles, mayflies, and caddisflies, were found above the confluence with the Iron River.

Eight-tenths of a mile below the confluence, the benthic population in the Brule River was severely altered. At this and other downstream stations on the Brule, the population of many sensitive forms commonly associated with clean water was drastically reduced. A typical example is shown in graphing the caddisfly population at selected stations (Figure 19).

(Figure 19 is as follows:)

Figure 19. Populations of selected bottom organisms—Brule River, August, 1963.



Riffle beetles and stoneflies closely follow the same pattern as shown by the caddisflies. The opposite effect is shown by those organisms that are able to secure their food supply while living in close association with a dense growth of filamentous green algae. The midges and mayflies (Figure 19) show a population increase at those sampling sites in which filamentous green algae are abundant. At the last station sampled, just above McGovern's Creek, clean water associated stoneflies and mayflies were abundant. The midge population was much reduced compared to the past two stations because of decreased algal growth and an increase in predators, but two groups, the clean water associated caddisflies and riffle beetles, had not attained the populations displayed at the stations above the confluence with the Iron River.

The biological investigations revealed that the bottom of the Iron River is severely degraded from Sunset Creek to its mouth; and during the survey supported a very small population of bottom organisms in its lower reach. The bottom of the Brule River is degraded throughout a distance of approximately 14 miles below the Iron River.

Those organisms that are reduced in population in the Brule River, below its confluence with the Iron, normally serve as an excellent source of fish food. The reduction in the fish food supply, and the cementing - by iron deposit - of gravel areas which will interfere with fish spawning, will serve to reduce the expected fish population within the affected areas.

The effect of the iron deposit on aquatic life in the Iron and Brule Rivers will be evident until the cementing of the rocks and rubble is broken down and natural living spaces for organisms are restored. Further investigations will be needed to determine if the present condition is a result of mine water pumped prior to February, 1963, or of current mine activity.

MR. STEIN: Mr. West, you may proceed with your oral statement.

MR. WEST: Now to go into the report proper, I think we can start off by looking at this map, the area map.

MR. STEIN: Mr. West, before we go into the reference to maps, in accordance with our usual procedure, maps will be reproduced and other charts will be reproduced in the record in black and white. We don't have facilities for color reproduction.

It would also be appreciated if you, as well as the other persons coming up, would not refer to a "blue" portion or a "red" portion on a chart or a map, since this will not have much meaning when someone reads the record.

Thank you, Mr. West.

MR. WEST: All right, Mr. Chairman.

Well, the trouble here is that our regional office and, I think, the State of Michigan have better maps than we have for the general area, but in view of your comment, while people will look at all of the maps, I will refer specifically to our location map, and it will be included in the transcripts. It is included in black and white in the original part.

The following discussion will be based on the material included in the complete report document. A few explanatory remarks will be added; but, in general, the material will be summarized and condensed as much as possible.

First of all, I wish to express our sincere appreciation for the generous assistance many of you present at this conference extended to us during the survey. In addition to the survey findings, the report includes data and information assembled through the cooperation of numerous Federal, State and local agencies, communities and industries in Michigan and Wisconsin. This invaluable assistance is gratefully acknowledged.

INTRODUCTION

The 1963 survey showed that about 8 miles of the Brule River, 22 miles of the Upper Menominee River, and 3 miles of the lower Menominee River, to its mouth, were polluted in varying degrees by industrial wastes and raw and treated sewage originating in both Michigan and Wisconsin. This pollution of these interstate waters endangered the health and welfare of persons in both Wisconsin and Michigan.

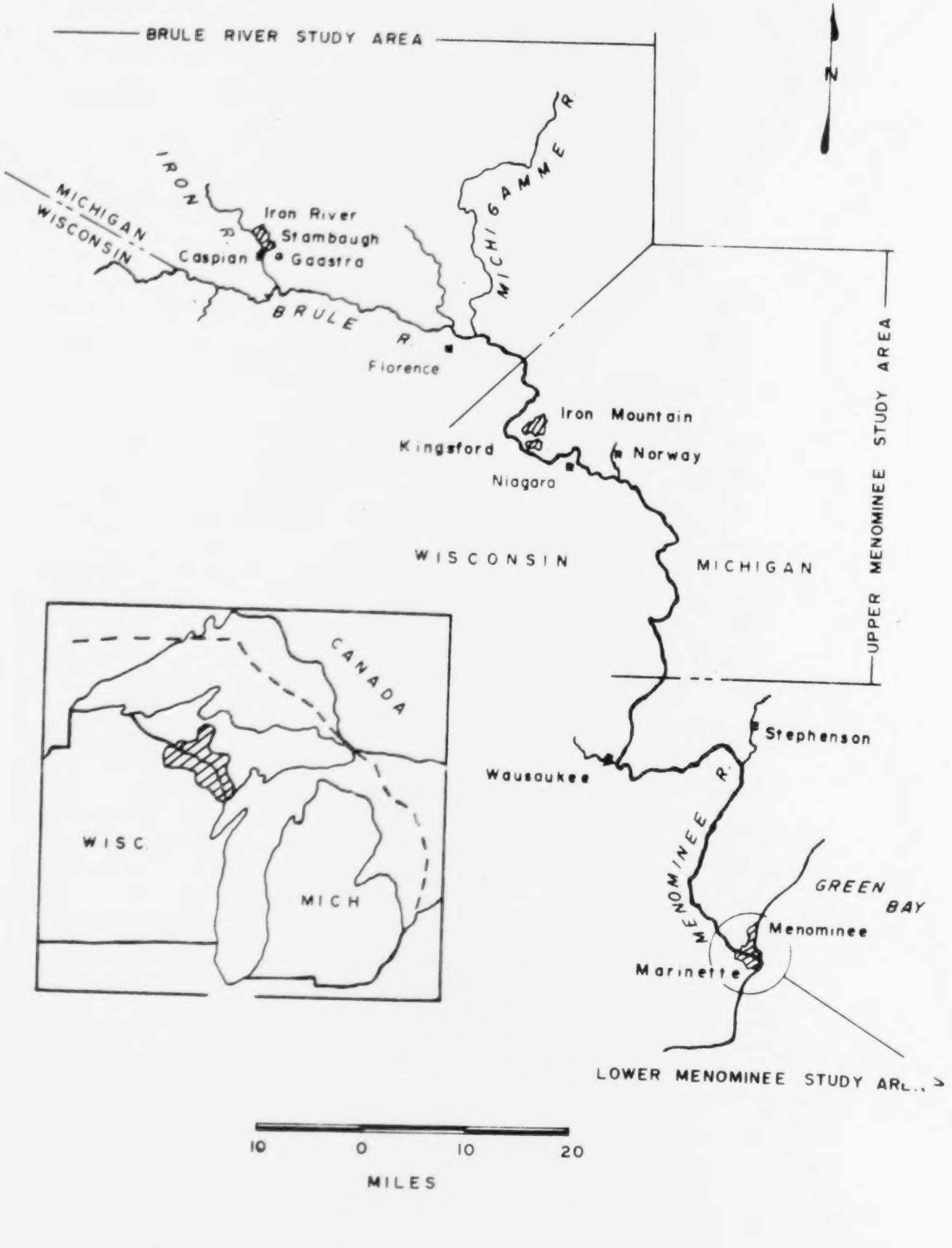
(The map referred to is as follows:)

LOCATION MAP

MENOMINEE RIVER

WISCONSIN – MICHIGAN

FIGURE 1


BRULE RIVER STUDY AREA
N
IRON R.
MICHIGAMME R.
MICHIGAN
WISCONSIN
Iron River
Stambaugh
Caspian
Gaastra
BRULE R.
Florence
Iron Mountain
Kingsford
Norway
Niagara
WISCONSIN
MICHIGAN
UPPER MENOMINEE STUDY AREA
CANADA
WISC.
MICH
Stephenson
Wausaukee
MENOMINEE R.
GREEN BAY
Menominee
Marinette
LOWER MENOMINEE STUDY AREA
10
0
10
20
MILES

A. W. West

THE AREA

The report is concerned with the reach of the Brule River, which serves as a boundary between Michigan and Wisconsin; the Menominee River, which is a boundary stream throughout its entire length; and those tributaries of both streams that carry wastes which contribute to pollution of the interstate waters.

The two interstate streams and their tributaries constitute the major surface water resource of the valley. This resource, which is an essential supplement to the natural beauty and cool summer temperatures of the valley, must be preserved if its full recreational potential is to be realized in competition with that of the adjacent area to the west, where natural lakes abound.

WATER USES

The Brule and Menominee Rivers provide opportunity for a variety of water uses.

MUNICIPAL WATER SUPPLY

No municipal water supply is taken directly from either the Brule or the Menominee Rivers.

Green Bay serves as the source of municipal water supply for Menominee, Michigan, and for Marinette, Wisconsin. The intakes for both supplies are located offshore from

Menominee, north of the mouth of the Menominee River. The river water ususally moves toward the south after entering Green Bay. Despite considerable construction cost, the Marinette intake line was carried beneath the Menominee River and out into the lake north of the mouth of the river in an effort to obtain lake water in preference to a mixture of lake and river water.

There are times, however, when lake currents reverse and carry Menominee River water toward the north and to both the Menominee and the Marinette intakes. At such times the presence of the river water is reflected in the need for increased dosages of water treatment chemicals.

These two supplies furnish water to about 25,000 persons for domestic use.

The river itself is used for an industrial water supply.

INDUSTRIAL WATER SUPPLY

About 18 million gallons per day of water for industrial processes is taken from the Menominee River by the Kimberly-Clark Corporation at Niagara, Wisconsin, the Scott Paper Company at Marinette, Wisconsin, and the Scott Paper Company and the Marathon Division of American Can Company at Menominee, Michigan.

HYDROELECTRIC POWER

Hydroelectric power is produced at dams on the Brule and Menominee Rivers and the quiet pools above some of the dams enhance the recreational potential of the rivers.

RECREATION

The Brule and Menominee Rivers are suitable for various recreational uses. The full recreational potential of the rivers has not yet been realized.

Fishing

Fishing is probably the major present recreational use of these two rivers. Trout fishing is the principal sport on the cool, swift waters of the upper reaches of the Brule River. Sturgeon, walleye, bass, crappie, and blue gill are the principal game fish in the Menominee River.

Boating

Because of swift, shallow rapids, some reaches of the river are suitable only for canoeing. Pools above the power dams are used for outboard motor boating. Major power boat use occurs in the Marinette-Menominee area, where a large boat docking and service area is available.

Swimming

A. W. West

The water of the Brule River is too cool to encourage swimming, and there are no known beaches on the Menominee. Where water is suitable, however, there will be some swimming by individuals on an unorganized basis, and the Menominee undoubtedly is no exception.

There are five beaches for organized swimming along the lake front in the Menominee-Marinette area. Water from the Menominee River undoubtedly reaches all of these beaches at times.

(Table 1 is as follows:)

TABLE 1

FEDERALLY-AIDED SEWAGE TREATMENT FACILITIES WITHIN THE MENOMINEE RIVER INTERSTATE AREA

MUNICIPALITY	COUNTY	DATE OF OFFER	AMOUNT OF GRANT	ELIGIBLE PROJECT COST	TYPE OF PROJECT	STATUS
MICHIGAN						
Iron Mountain-Kingsford	Dickinson	6-11-59	135,600	467,512	Primary with chlorination	Completed 11-4-60 - WPC
Iron River	Iron	11-29-57	58,940	196,468	Primary with chlorination	Completed 11-5-59 - WPC
Iron River	Iron	10- 8-63	6,250	12,500	Interceptor	Plans and specifications under preparation - APW
Stambaugh	Iron	11-15-57	58,048	199,288	Interceptor and Activated Sludge	Completed 11-18-58 - WPC
Stephenson	Menominee	1- 7-63	46,200	114,800	(Additions) Trickling filter with chlorination	Under construction - APW
WISCONSIN						
Florence	Florence	10-18-57	16,395	55,335	Stabilization pond	Completed 11-6-59 - WPC
Wausaukee	Marinette	1- 9-63	26,350	68,400	Stabilization pond	Under construction - APW

A. W. West

I am condensing a part of the report.

CONTROL ACTIVITIES OF STATE AGENCIES

Sewage and waste treatment facilities, constructed in compliance with active water pollution control programs of the Michigan Water Resources Commission and the Wisconsin Committee on Water Pollution, are described in the report. A full report on these important programs and accomplishments will undoubtedly be presented here later by the conferees and participants from Michigan and Wisconsin.

FEDERALLY AIDED SEWAGE TREATMENT FACILITIES

Seven sewage treatment projects in Iron Mountain-Kingsford, Iron River, Stambaugh, and Stephenson, Michigan, and Florence and Wausaukee, Wisconsin have received construction grant aid under the Federal Water Pollution Control Act. The $1,114,303 total eligible cost of these projects includes $347,783 in Federal grants.

River Discharge and Drought Flow Records

Some of this is partly explanatory. The minimum seven-day average river discharge that will most probably occur once every ten years is a commonly accepted design criterion for pollution abatement work. Pollution abatement facilities should therefore be capable of reducing pollution loads to levels that can be discharged into the Menominee River system without damaging the water resources during critical periods when the river discharge is considerably lower than the flows that prevailed during the August 1963 survey.

Summer rainfall in this area was the lowest experienced for many years. Water withdrawn from storage behind the power dams, however, supplemented discharges in the Menominee River. During the twelve days of the August 5-16, 1963, survey, the mean daily river discharges averaged 48 cubic feet per second (cfs) in the Iron River and 300 cfs at the mouth of the Brule. The Menominee River discharges averaged 1,200 cfs in the Niagara area, 1,330 cfs at Chalk Hills Dam, which is about 20 miles or so below Niagara (river mile M-56.6), and 1,400 cfs at the Grand Rapids Dam some 25 miles above Marinette.

The report discusses "Drought Flows of Michigan Streams" and shows that the low river discharges that prevailed during the 1963 survey can be expected to recur at least once every two or three years.

We will now start on some of the detailed sections of the three surveyed areas.

Incidentally, the entire survey was divided into three portions: One was the Upper Menominee River, a separate survey for separate conditions down in the Lower Menominee in the Menominee-Marinette area, and the third portion of the overall total survey occurred at about, I think, some 23-plus miles on the Brule River above the Iron River, which is the drainage down through past Florence, Wisconsin, and then to the point where the Brule joins the Michigamme to form the Menominee River.

From here on in, we will refer to some of the charts, and I would like to ask Kent Mackenthun, the biologist with this section, who conducted the biological portion of the work, and who is the author of the biological section of the report, to help in setting up and presenting the charts.

He will also have some statements to make later on in the discussion.

Kent, if you would please set up Figure No. 2?

MR. STEIN: Mr. West, will you continue, please?

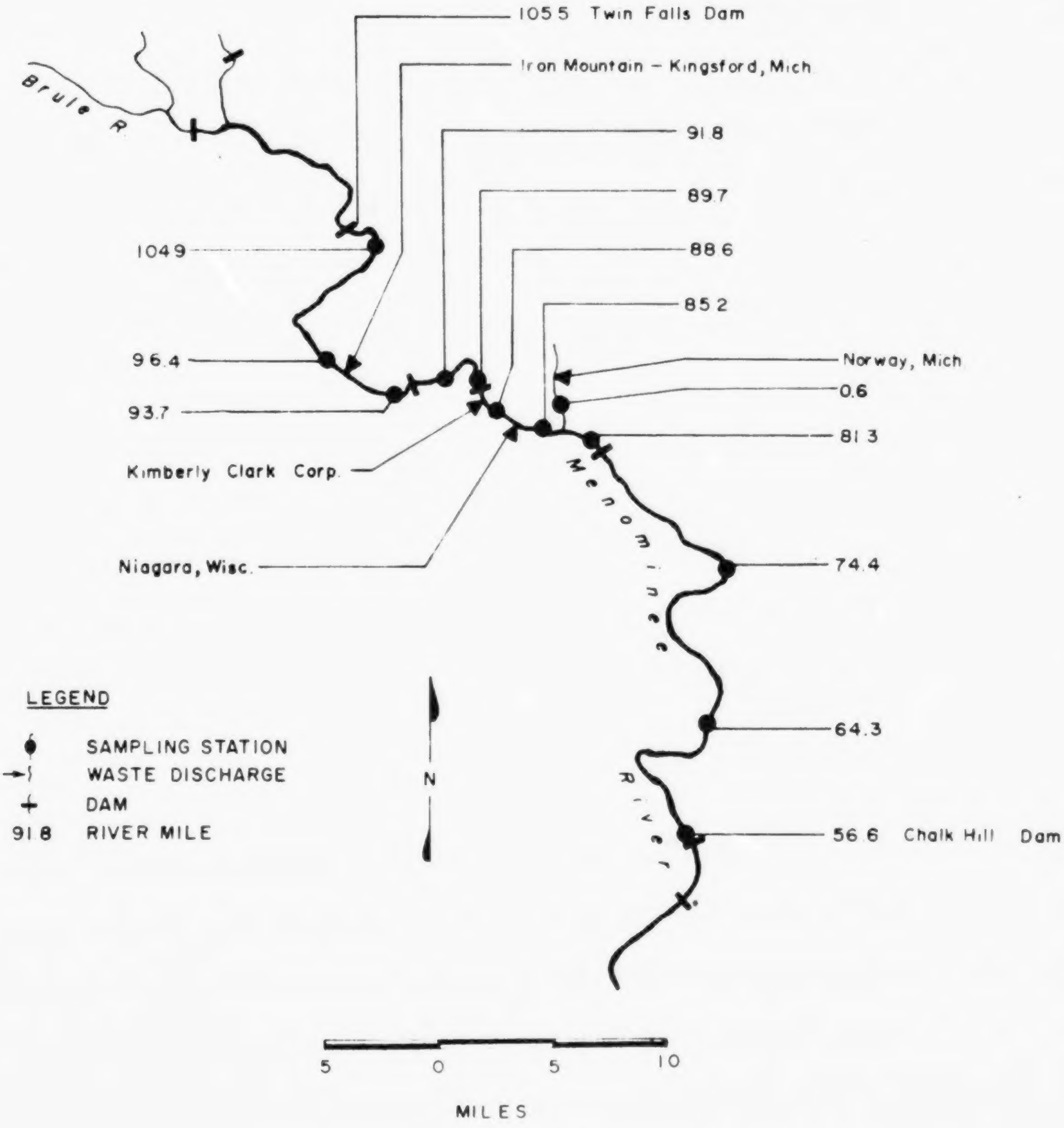
MR. WEST: Yes, sir.

(Figure No. 2 is as follows:)

UPPER MENOMINEE RIVER

LOCATION MAP

FIGURE 2


105.5 Twin Falls Dam
Iron Mountain – Kingsford, Mich.
91.8
89.7
88.6
85.2
Norway, Mich.
0.6
81.3
104.9
96.4
93.7
Kimberly Clark Corp.
Niagara, Wisc.
74.4
64.3
56.6 Chalk Hill Dam
Brule R.
Menominee River
N
LEGEND
● SAMPLING STATION
→ WASTE DISCHARGE
+ DAM
91.8 RIVER MILE
5
0
5
10
MILES

MR. WEST: UPPER MENOMINEE RIVER

SOURCES OF WASTES

The sources of wastes discharged to the Upper Meonominee River are shown on Figure 2.

Iron Mountain-Kingsford

Iron Mountain and Kingsford, Michigan, with a total sewered population of 14,400, operate a primary sewage treatment plant with two-stage, pre-and post-, chlorination facilities. Treated sewage is discharged to the river at Mile 96.2

Niagara, Wisconsin

Niagara, Wisconsin, with a sewered population of 2,000, operates a primary sewage treatment plant with single-stage, post-, chlorination. Treated sewage enters the river at Mile 88.5.

Norway, Michigan

Norway, Michigan, with a sewered population of 3,170, does not provide sewage treatment facilities. Raw sewage enters Sewer Creek approximately 2.4 miles above its mouth, where it joins the Menominee River at Mile 83.1.

Combined storm and sanitary sewers serve areas in these communities. During periods of excessive rainfall, some of the raw sewage and accumulated sludges and slimes are flushed out of the sewers, and directly into the river.

Kimberly-Clark Corporation

The Kimberly-Clark mill in Niagara, Wisconsin, produces approximately 94 tons of sulfite pulp, 97 tons of groundwood pulp, and 386 tons of paper products per day. Fiber recovery systems are provided and a portion of the concentrated waste sulfite liquor is hauled away from the mill for use as road binder. Waste sulfite liquor is also disposed of at the company's spray irrigation facilities during periods of low river flow. All other wastes are discharged to the Menominee River below the dam at River Mile 89.7.

(Table No. 2 and Figure 3 are as follows:)

TABLE 2

SOURCES OF WASTES

Estimated Net Loads to Upper Menominee River

August, 1963

SOURCE	ORGANIC WASTES (5-Day BOD)		SOLIDS WASTES (Vol. Susp. Solids)	
	Population Equivalents	% of Total	Tons/Day	% of Total
Iron Mountain-Kingsford, Michigan(1) (Primary Treatment with pre- and post-chlorination)	9,800	3.1	0.2	2
Kimberly-Clark Corp.(2) Niagara, Wisconsin (Fiber recovery, spray irrigation, and hauling for road binder)	304,800	96.1	10.1	96
Niagara, Wisconsin(3) (Primary Treatment with prechlorination)	1,500	0.5	0.1	1
Norway, Michigan(4) (No Treatment - raw sewage discharged to Sewer Creek)	840	0.3	0.1	1
TOTAL -	316,940	100.0	10.5	100

---

(1) Data from Sewage Treatment Plant operating reports.

(2) Calculated from basic data provided by Kimberly-Clark Corporation.

(3) P.E. from 1963 rough draft for Revised 1960 Summary Report. Solids calculated from P.E. estimate and average reductions.

(4) Calculations based on samples collected from Sewer Creek near mouth.

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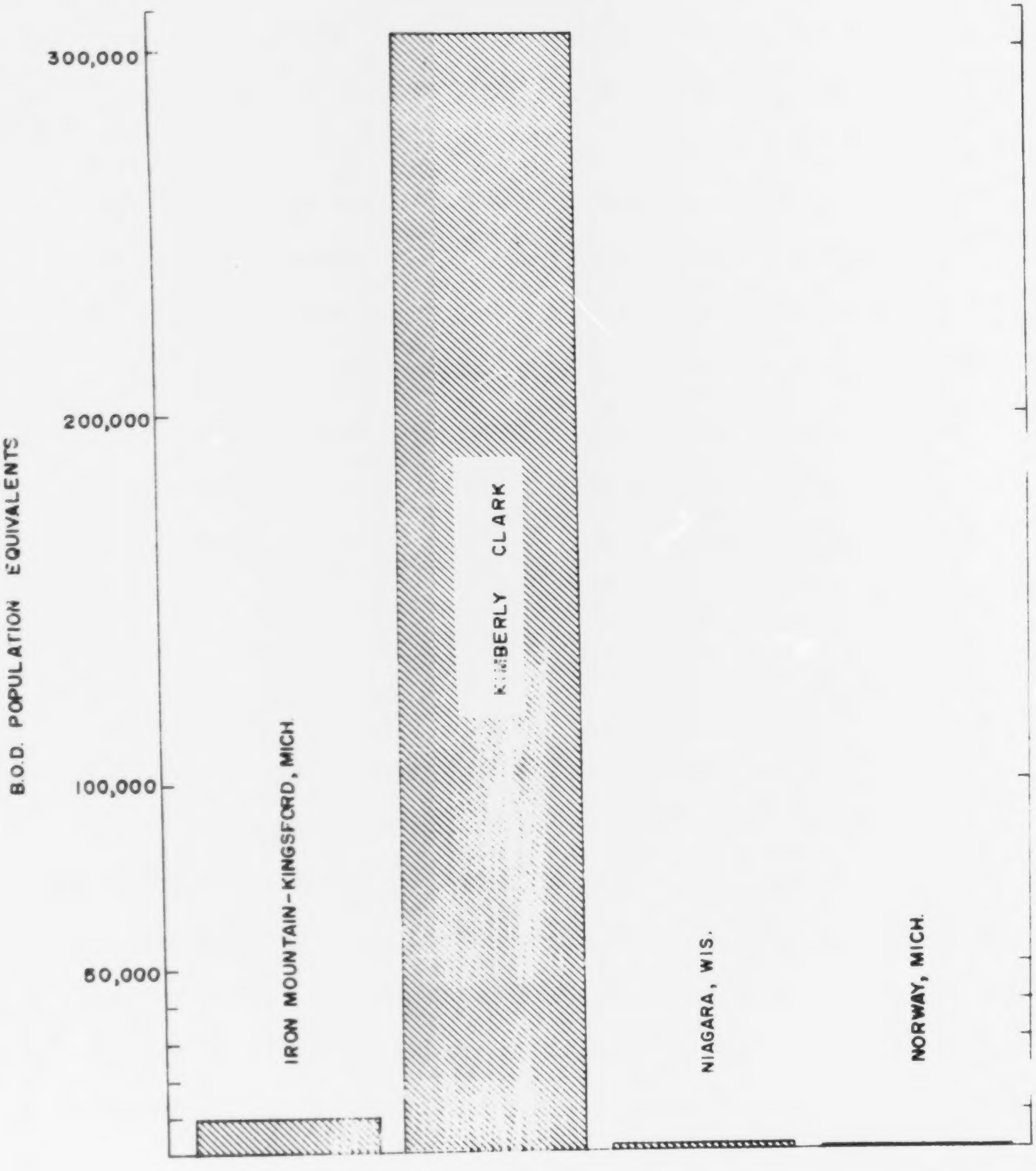
(4) Calculations based on samples collected from Sewer Creek near mouth.

SOURCES OF WASTES
B.O.D. POPULATION EQUIVALENTS
UPPER MENOMINEE RIVER
FIGURE 3



MR. WEST: Kent, will you set up Figure No. 3, please?

Constituents of the waste discharges, that pollute the Upper Menominee River, fall within the three broad classifications of organic, solids, and bacterial pollutants.

Organic pollution was measured by the five-day biochemical oxygen demand test, more commonly referred to as the B.O.D., which is a measure of the dissolved oxygen used by organic material in water. The amount of B.O.D., or organic material, in such wastes or in the streams, is expressed in population equivalents, or P.E., with one population equivalent being equal to 1/6 of a pound of 5-day B.O.D.

Organic Wastes

As shown on Figure 3, approximately 304,800 population equivalents, or approximately 96 percent of the total organic wastes load entering the Upper Menominee River, was discharged by the Kimberly-Clark pulp and paper mill in Niagara, Wisconsin. The remaining 4 percent of the total organic load was discharged in the raw sewage from Norway and the sewage treatment plant effluents from Iron Mountain, Kingsford and Niagara.

A. W. West

During a recent discussion, some of the folks reviewing this report did not like the term "population equivalent," so we can convert this right back into something somebody else may like.

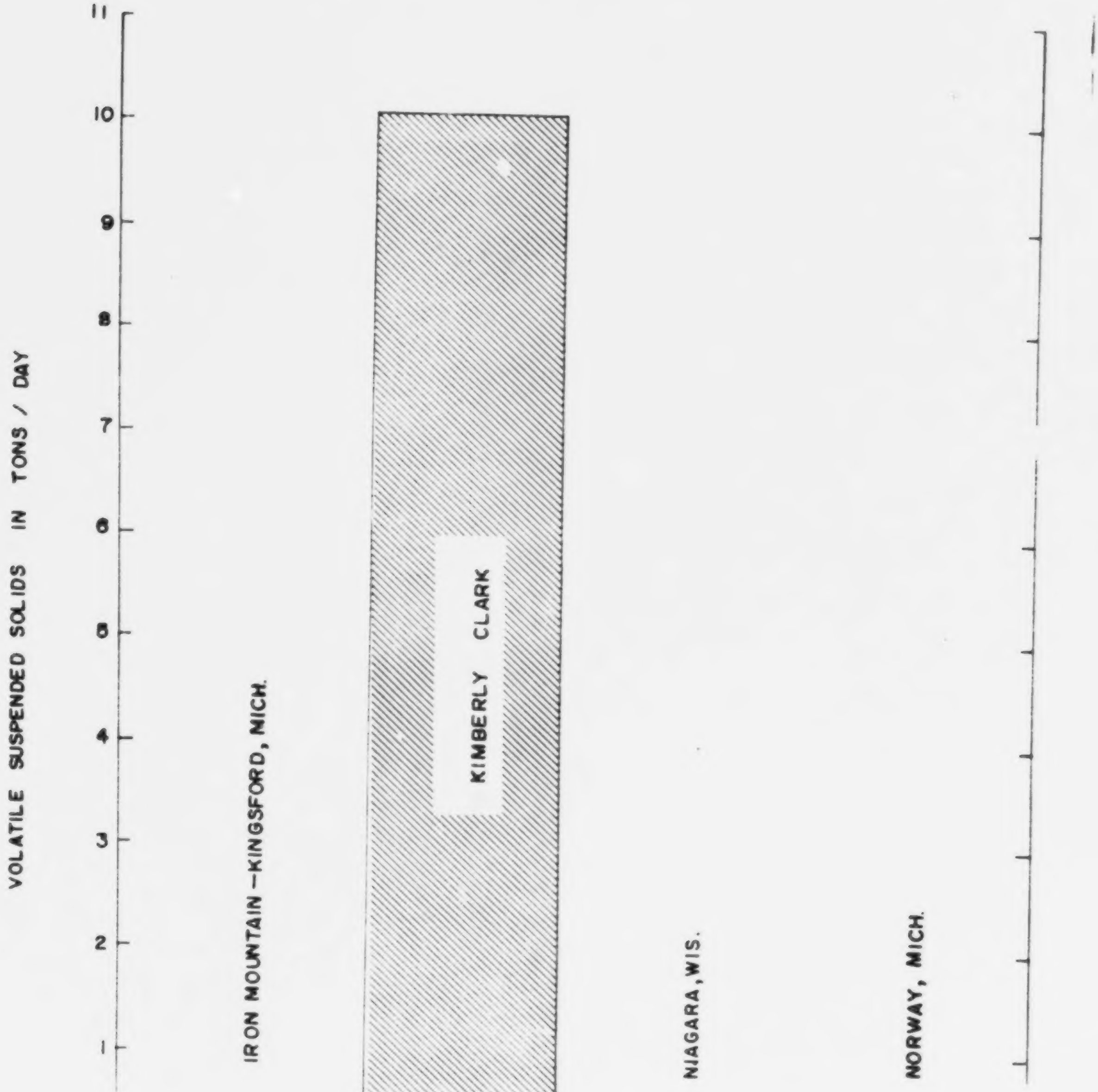
For instance, in terms of pounds of B.O.D., here is the way it would come out: The waste discharge from Kimberly-Clark amounts to 51,000 pounds or 25-½ tons of B.O.D. per day, which still amounts to the 96 percent of the total organic load discharged through this area of the Menominee River.

Now, Kent, if you will set up Figure 4, please?

(Figure 4 is as follows:)

SOURCES OF WASTES
VOLATILE SUSPENDED SOLIDS
UPPER MENOMINEE RIVER

FIGURE 4



A. W. West

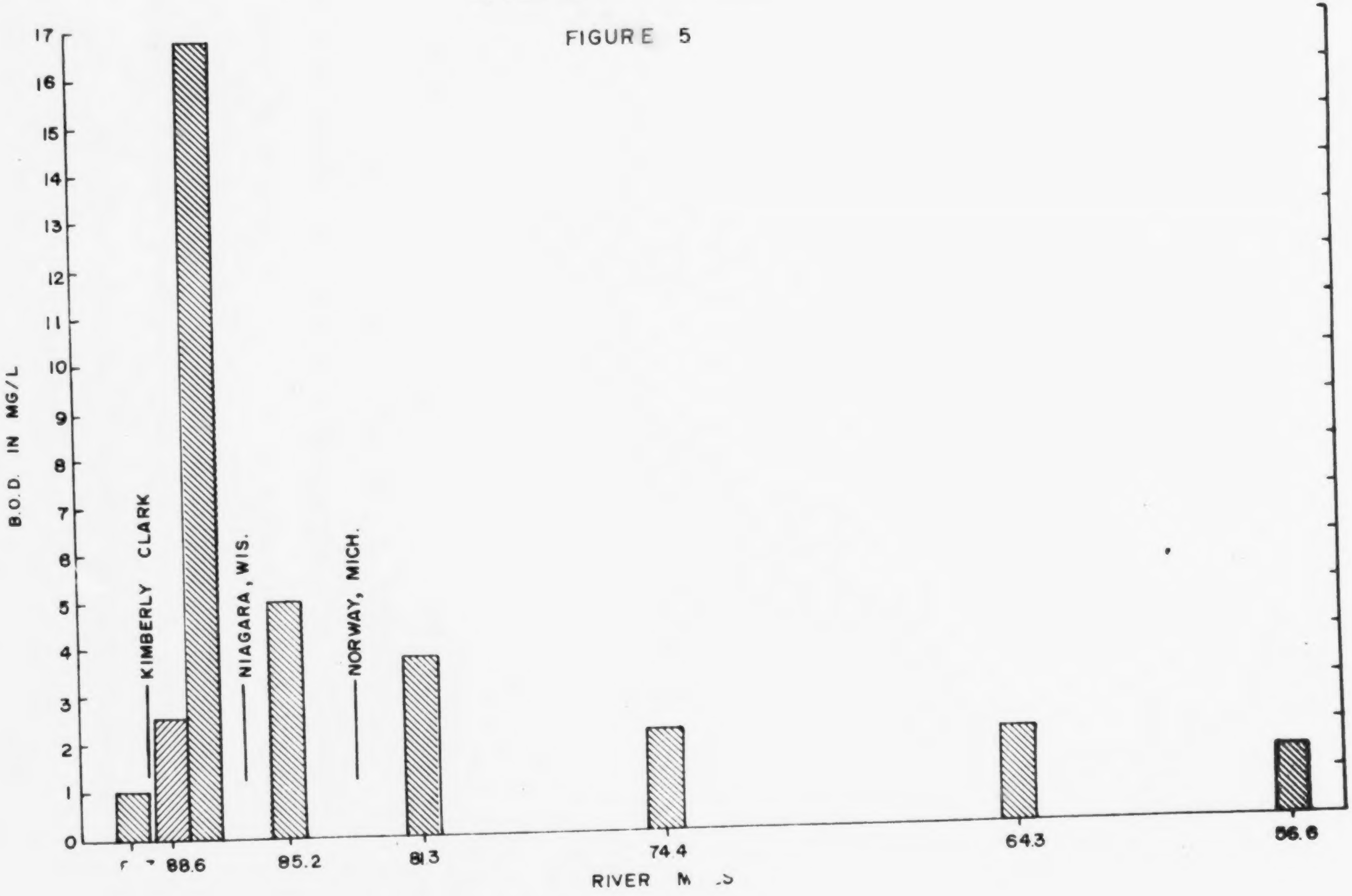
MR. WEST: The estimated amounts of solid wastes entering the Upper Menominee River are shown on Figure 4. Approximately 10.1 tons per day -- and again this works out to about 96 percent of all volatile suspended solids entering the Upper Menominee River, were discharged by the Kimberly-Clark mill in Niagara. The remaining 4 percent of the total was discharged by the three previously named communities.

(Figure 5 is as follows:)

B.O.D.

UPPER MENOMINEE RIVER

FIGURE 5



MR. WEST: Will you set up Figure 5, please?

Next, the report deals with the effects on water quality.

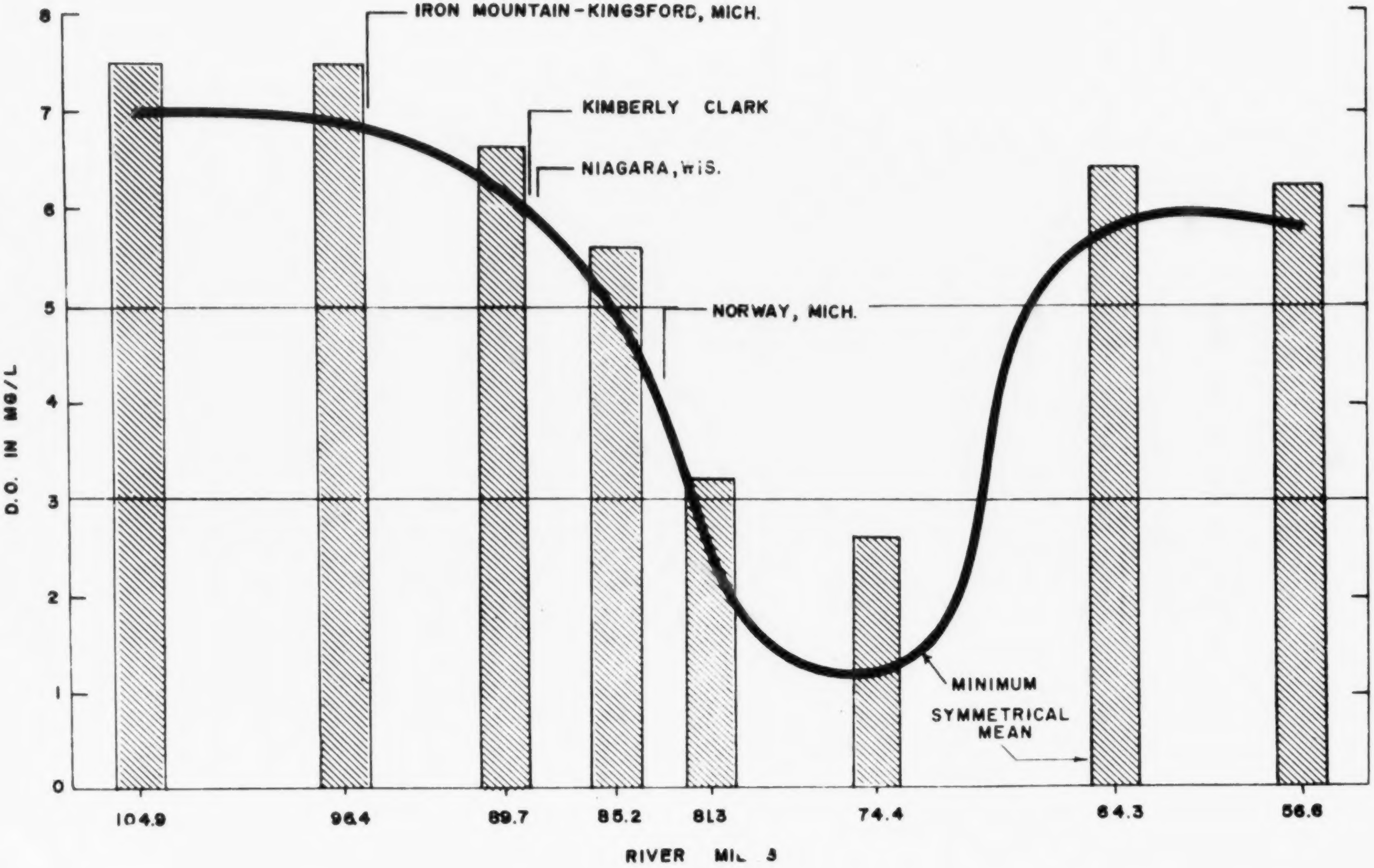
5-Day Biochemical Oxygen Demand (B.O.D.)

The concentration of organic wastes in various reaches of the Upper Menominee River, as measured by the B.O.D. test, is shown on Figure 5. In the impoundment immediately above the Kimberly-Clark dam, the B.O.D. averaged 1.1 mg/1. Basically, this is a good average for a clear water stream. About one mile below the paper mill, in the waste stream along the Wisconsin side of the river, the B.O.D. increased to 16.8 mg/1. At the U. S. Highway No. 8 bridge, 4-½ miles below the mill, the wastes were mixed throughout the Michigan and Wisconsin waters across the entire river channel, and the B.O.D. averaged 5 mg/1. For a distance of approximately 25 miles below the paper mill, the dissolved oxygen resources of the river were used, and reduced, in satisfying the biochemical oxygen demand of the organic wastes.

(Figure 6 is as follows:)

DISSOLVED OXYGEN
UPPER MENOMINEE RIVER

FIGURE 6



MR. WEST: Will you please set up the next chart?

Dissolved Oxygen (D.O.)

Here is a little bit of an explanation: For sustained propagation of a normal healthy warm water game fish population, fresh water rivers and lakes should contain at least 5.0 mg/1 of dissolved oxygen. Although moderate reductions of D.O. below this level for short periods of time may not injure adult fish, it is generally agreed that the dissolved oxygen concentration should at no time be reduced below a minimum of 3.0 mg/1.

The Wisconsin Committee on Water Pollution defines dissolved oxygen limitations as follows:

> "The Dissolved Oxygen (DO) in parts per million (p.p.m.) is a measure of the amount of oxygen dissolved in water. A saturated solution of dissolved oxygen in water will contain about 14.0 p.p.m. at 0° and about 8.5 p.p.m. at 25° C. Concentrations of less than 5.0 p.p.m. DO interfere with fish propagation and concentrations of less than 3.0 p.p.m. DO are considered critical for fish life."

MR. WISNIEWSKI: May I interrupt?

What is the difference between milligrams per liter and parts per million?

MR. WEST: Thank you, Ted.

Parts per million is the same as milligrams per liter. One pound of dissolved oxygen in one million pounds of water is a part per million, which is just the same as in the decimal units, a milligram, which is a really bitty part of a milligram of dissolved oxygen in a liter of water, and a liter, as you know, is about two quarts.

I hope I will straighten out the milligrams per liter which is a later term, but they are synonymous -- milligrams per liter and parts per million. It is the parts in a million parts.

Is that all right, Ted?

MR. WISNIEWSKI: Yes.

MR. WEST: The extent to which organic pollution lowered the dissolved oxygen concentrations in the Upper Menominee River during the August 1963 survey is illustrated on the D.O. chart, Figure 6. The solid line traces minimum observed D.O. and the bars represent the symmetrical mean of all samples collected at each station.

The symmetrical mean D.O.'s were determined as follows: All D.O.'s observed at each sampling station were arrayed in descending order and plotted on probability paper.

The symmetrical mean D.O. is the level at which the observed D.O. trend line crossed the 50 percent time of occurrence line. Thus, the dissolved oxygen concentration in the river was equal to or less than the symmetrical mean D.O. value 50 percent of the time.

The symmetrical means are shown as the bars.

The symmetrical mean dissolved oxygen was reduced from 7.5 mg/1 above Kingsford (M-96.4) to 6.6 mg/1 above the Kimberly-Clark dam (M-89.7), some 6-½ miles downstream from the Iron Mountain-Kingsford sewage discharge. Water in the impoundment above the Kimberly-Clark dam remained satisfactory, but the dissolved oxygen concentration had decreased 0.9 mg/1. Calculations indicate that only one-third of this oxygen reduction, or less than 0.3 mg/1, can be attributed to the treated sewage discharge by Iron Mountain-Kingsford. The remainder may be caused by decomposition of the sludge deposits which were observed along the river bottom from Kingsford to the neck of Upper Quinnesec Reservoir.

Wastes from the Kimberly-Clark mill are discharged to the river below the power dam in Niagara. For more than 15 miles below this point the dissolved oxygen was progressively reduced by the decomposition of organic wastes in the river. During the August 1963 survey, the mean dissolved oxygen concentrations fell to 3.2 mg/1 at the Norway Power Dam (M-81.3) and to 2.6 mg/1 at the railroad bridge near Faithorn, Michigan (M-74.4), some 15 miles below the paper mill sewers. At each of these two stations, all samples contained less than 5 mg/1 and 6 out of 10 of the samples contained less than 3 mg/1. Furthermore, the minimum values recorded at these two stations were 2.3 and 1.2 respectively.

This severe reduction in dissolved oxygen, caused almost entirely by waste discharges from the Kimberly-Clark pulp and paper mill in Niagara, reduced the Menominee River water quality below the critical level for fish life.

MR. MC DERMOTT: Mr. West, could I ask you at this point, actually how much length of river is involved in a situation where you run into a D.O. so low that you have conditions harmful to fish life? How would you express that in actual length of river?

MR. WEST: Well, if we are thinking of the terms of the 5 milligrams per liter, the length where the water is depressed below the desirable level for fish, we have a distance of about 15 miles; about 15 miles where the dissolved oxygen was lower than the desirable limit.

In the limit below the 3, which is considered the critical for fish life, you go from 81.3 -- the station is located at the Faithorn Bridge, but this condition undoubtedly prevails below for some distance.

I would say, in round numbers, 10 miles.

MR. MC DERMOTT: Thank you.

MR. WEST: That is as close as I can come on that.

Suspended Solids

From Niagara, Wisconsin, down to the Norway power dam, the appearance and esthetic appeal of the Menominee River suffered greatly from the effects of solids pollution entering the stream. Suspended material, floating down the stream, produced a yellowish turbid appearance and scattered patches of decomposing sludge were observed floating on the surface of the water.

The mass of volatile solids suspended in the river, calculated from data collected during the survey, amounted to 2.3 tons per day above Niagara. About one mile below the pulp and paper mill (M-88.6), the solids content increased sharply to 13 tons per day. Downstream these values tapered off to 7.8 at County Trunk Z(M-64.3), and 4 tons per day in the impoundment above Chalk Hills Dam (M-56.6), some 33 miles below Niagara.

This degraded appearance, caused principally by solids discharged in the paper mill wastes, damaged the recreational potential of this reach of the Menominee River.

Biology

A natural unpolluted stream has many different kinds of organisms, but because of natural predation and competition for food and space, relatively few individuals represent each of the various kinds. The more desirable fish food organisms, which cannot tolerate pollution, predominate.

A stream polluted with organic wastes, to the contrary, is limited to few, probably three or four, kinds of pollution-tolerant organisms, but because of the increase in available food supply, the population numbers for some of the kinds are very high. For example, sludgeworms, which are not used as fish food by game fish, are usually found in great numbers in areas polluted by organic wastes.

To summarize, so we can put this biology in proper perspective, here is the key to it. Unpolluted waters contain relatively few numbers of many different kinds of bottom organisms, while polluted waters contain very high populations of only a few different kinds of organisms.

(Figure 7 is as follows:)

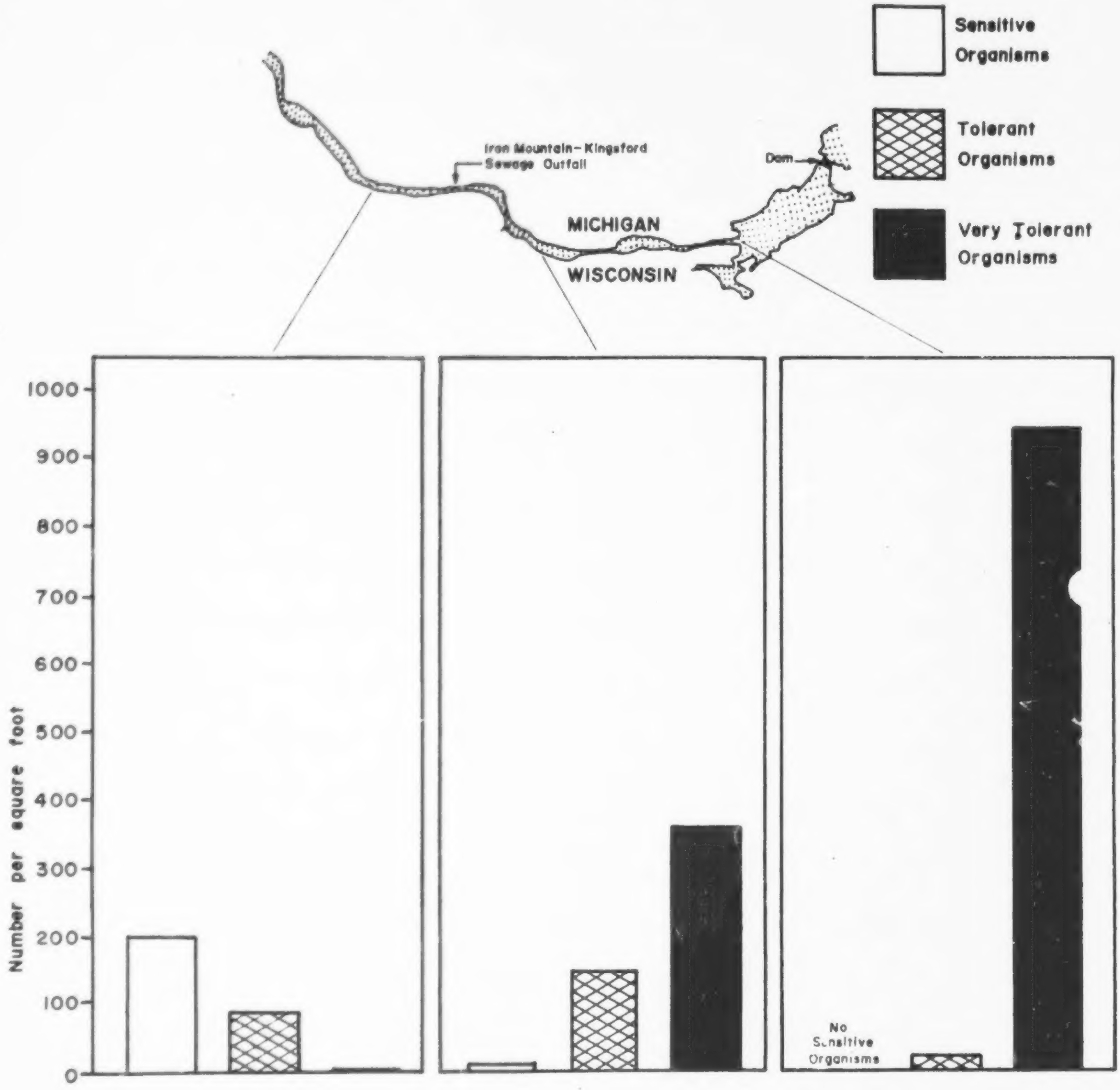


Figure 7 . Bottom organism populations — Iron Mountain-Kingsford area, Menominee River, August, 1963

MR. WEST: Now we will go into the actual biology study, and, Kent, will you put up Figure 7, please?

Current Biological Data

In the Kingsford-Iron Mountain, Michigan, area, samples were taken one-half miles above the sewage treatment plant outfall, one-half mile below the outfall, and again where the river enters Upper Quinnesec Reservoir (Figure 7). Above the sewage plant outfall there existed a balanced bottom dwelling community consisting of many sensitive organisms and relatively few very tolerant sludgeworms. These bottom organisms indicate the suitability of the stream at this point for the development of normal stream life, including fish.

At the sampling site one-half mile below the outfall, sensitive forms were much reduced compared to the station one mile above and sludgeworms had increased from four per square foot to 335 per square foot.

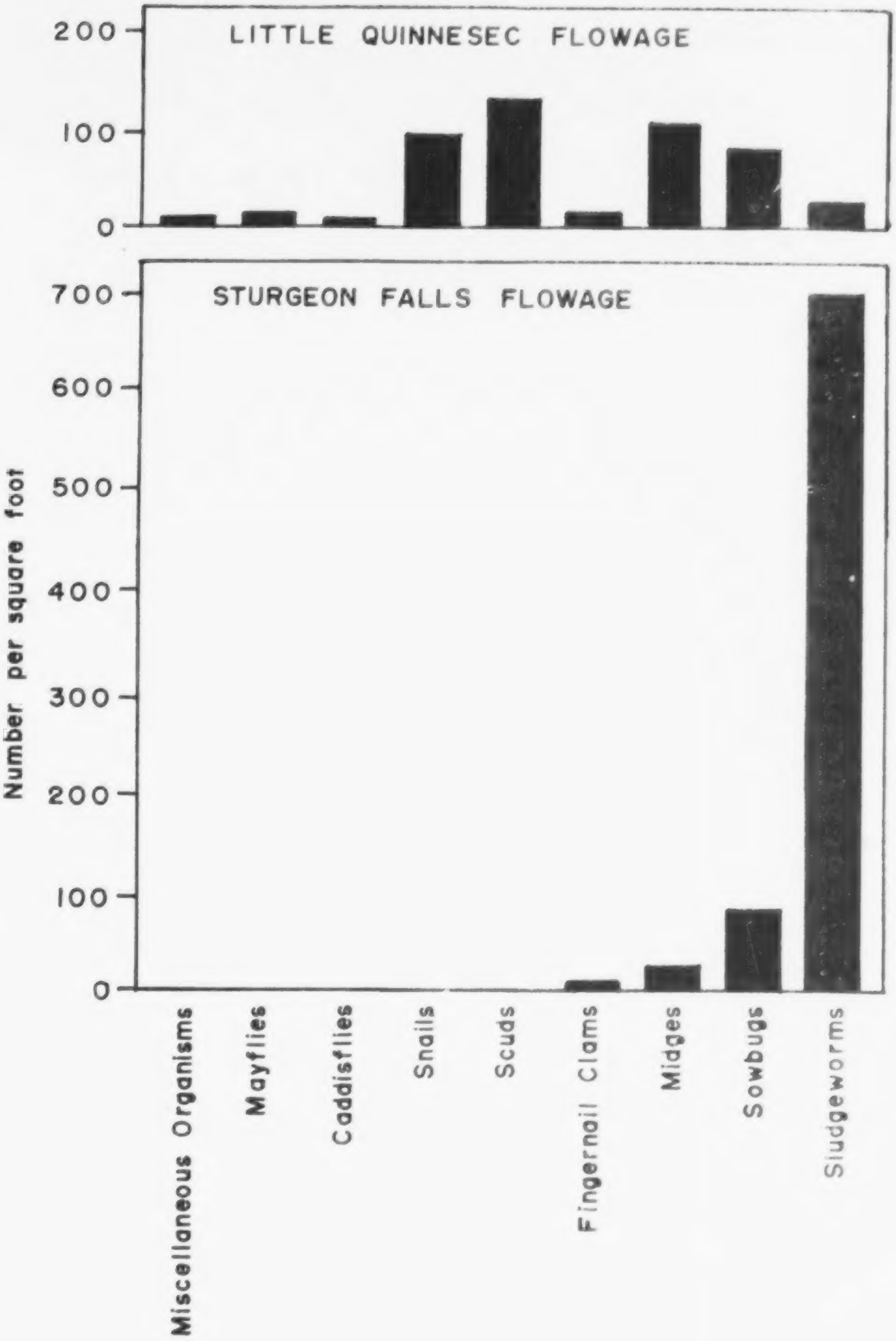
As the river enters Upper Quinnesec Reservoir, settled solids formed a delta around the neck of the reservoir. Samples from this area revealed a sludgeworm population exceeding 950 per square foot and no sensitive organisms, representing a habitat polluted with sludge. These sludge deposits eliminate most fish food that would normally develop

A. W. West

on the bottom at this point. The bottom material had a definite sewage odor. Additional samples, collected from the upper end of the reservoir but away from the river channel, revealed burrowing mayflies and gill-breathing snails, and a much reduced sludgeworm population, indicating that the polluted habitat is limited to the neck of the reservoir.

(Figure 8 is as follows:)

Figure 8. Comparison of bottom organism populations — upper Menominee River flowages, August, 1963.

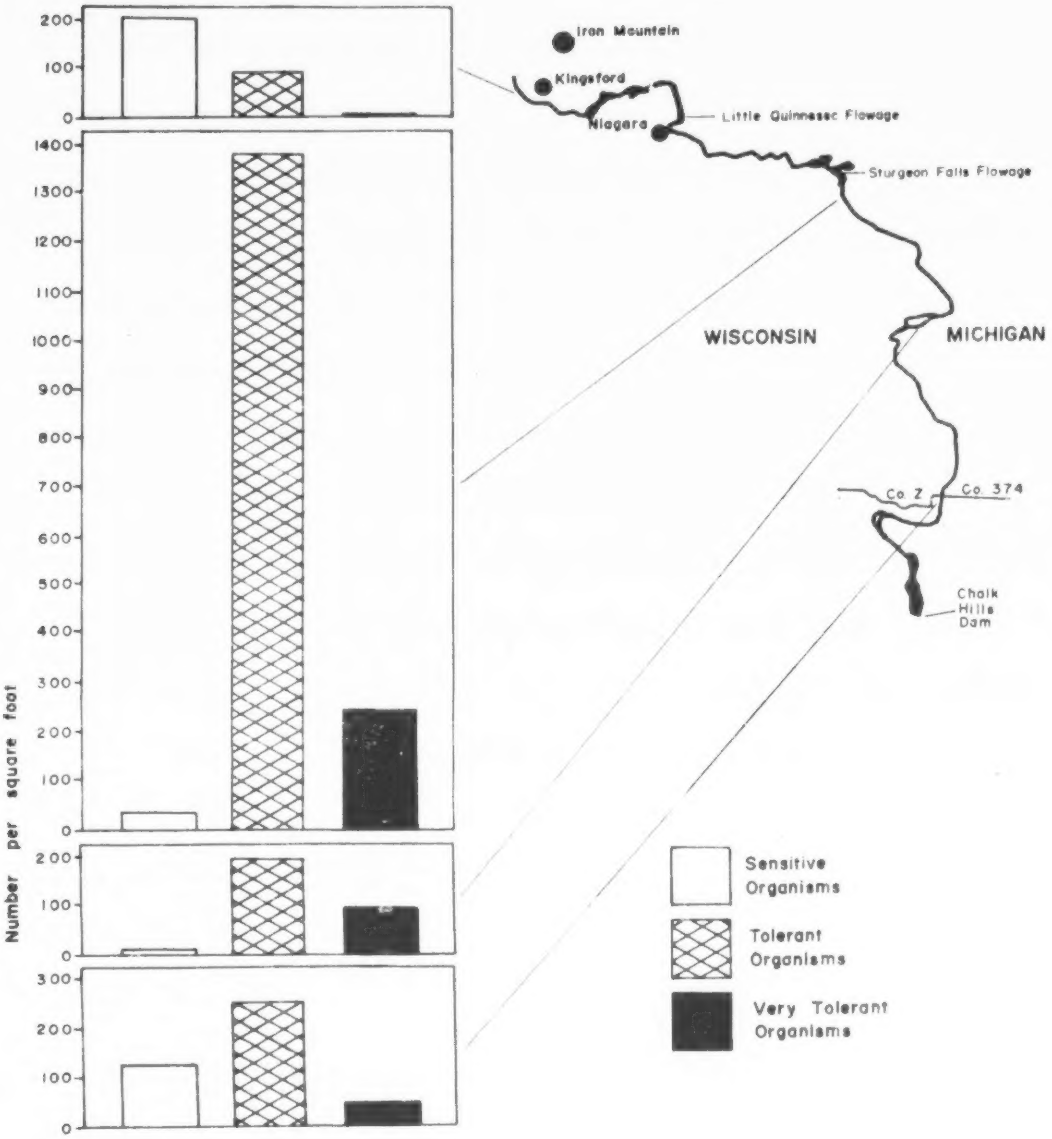


MR. WEST: Now, if we may have the next chart, Figure 8?

The effects of pollution in reservoir areas are shown on Figure 8. The bottom organism population found in the Little Quinnesec Reservoir above Niagara is considered typical for a clean water environment. A great diversity of organisms was found. In the Sturgeon Falls Reservoir, below Niagara, forms sensitive to pollution were eliminated and the sludgeworm population was drastically increased, indicating degraded bottom conditions by wastes discharged from the Niagara area. The water was definitely turbid; sludge and wood chips were found in areas of reduced current. Wood fibers and limited quantities of slime bacteria were present.

(Figure 9 is as follows:)

Figure 9. Populations of bottom organisms — upper Menominee River, August, 1963.



MR. WEST: May we have the next chart, Figure 9, please?

The effects of pollution on flowing water is shown on Figure 9. A balanced bottom dwelling community, consisting of many sensitive organisms and relatively few tolerant sludge worms, was observed at the clean water station above the Iron Mountain-Kingsford sewage treatment plant outfall.

One-half mile below the Kimberly-Clark mill at Niagara, Wisconsin, slime bacteria and wood chips were observed floating downstream. The river bottom was coated with slime bacteria and fibers, and small balls of sludgeworms entwined themselves in this mass, indicating severe biological degradation. Fish food and fish spawning areas have been destroyed. Just below Pier's Gorge the rock bottom was extremely slick and was covered with a filamentous green algae, wood fibers, and slime bacteria. This substratum supported principally tolerant leeches and isopods, with an occasional mayfly.

Below Sturgeon Falls Dam (Figure 9), there existed a dense growth of several types of aquatic vegetation including algal streamers that reached a length of 15 to 20 feet. The bottom organism population was composed principally of a large number of tolerant forms. Sensitive forms were much reduced, and very tolerant forms were increased.

Samples collected about two miles above Kremlin Falls indicated similar degraded bottom conditions. However, there was some reduction in tolerant forms, which indicated the beginning of stream recovery. Slime bacteria or wood fibers were not observed in quiet water areas; however, small wood chips were noted.

At County Trunk Z, 25 miles below the paper mill, a bottom dwelling community was found that is considered normal for a healthy river environment.

Conservation officers report no fishing pressure in the area above Niagara, Wisconsin, because of the polluted condition of the river. Access areas, although limited in nature, are present but currently are not being used. The access area at Kremlin Falls, however, did appear to be used at the time of the biological investigation.

MR. OEMING: Mr. West, may I interrupt?

MR. WEST: Yes, sir.

MR. OEMING: You said there was no fishing pressure in the area above Niagara, Wisconsin.

MR. WEST: Thank you very much. I will have to learn how to read.

MR. MC DERMOTT: May I ask one question?

MR. STEIN: Let him answer the first question, please.

MR. WEST: No fishing pressure in the area below Niagara, Wisconsin. I am awfully sorry.

MR. STEIN: Mr. McDermott?

MR. MC DERMOTT: Yes. I had one question, Mr. Stein.

MR. STEIN: Yes.

MR. MC DERMOTT: This report contains much hearsay evidence which would be admissible in a conference or hearing of this type, although not admissible in a court.

What is meant by the term "no fishing pressure"? Does this mean no fishing by anybody, or the area is not used for fishing? May I ask Mr. Mackenthun?

MR. MACKENTHUN: I think the latter definition would fit.

MR. MC DERMOTT: There might be some fishing there, Mr. Mackenthun. Is that right?

MR. MACKENTHUN: Yes.

MR. WISNIEWSKI: I have a question with reference to the characteristics of the stream in this region.

Wouldn't that adversely play on fishing pressure? If it is a fast-flowing stream, and if people have a choice of going to a lake to fish rather than fish in that area, wouldn't they rather go to the lake area?

MR. WEST: Ted, I can't speak for other people. There again you get opinions. It is rapid, but I mean if this were not polluted, they could fish intensively in these pools below the rapids.

There again we are talking about hearsay discussions that we have received from the Conservation Department.

MR. STEIN: I don't think we have to keep qualifying this constantly here.

Recognize that the testimony is not under oath, not subject to cross examination, and that a good deal of this in here is hearsay testimony.

Obviously, a good portion of what you are doing is dealing with the biological study done by Mr. Mackenthun, who is right here, and we can call him for the purposes of clarity or trying to get a clear picture.

I think we recognize that we are going to accept all statements that anyone considers relevant here. We are not going to shut anyone off.

MR. WEST: I would be glad to describe anything we have done. The data we talk about are factual.

The discharge of large and small wood chips from paper pulp mill operations in Niagara interferes greatly with the normal uses of the bottom substratum by bottom-dwelling organisms, fish, and other aquatic life. These chips, that eventually become water-logged and sink, destroy natural homes for bottom organisms, and also serve as a substrata for the development of slime bacteria which tend to mat together masses of wood chips, fibers, and other debris, which blanket the bottom in this area and cover up fish spawning areas. As the mat becomes more extensive, it collects gasses of decomposition which, on occasions, bring a mass of such material to the water surface where it is again broken up, dispersed, and often carried to a new location downstream. These solids, fibers, slimes, and floating septic sludge patches degraded the appearance of the river and reduced its esthetic appeal for general recreational use.

These solids pollution damages to 22 miles of the Upper Menominee River are caused principally by wastes from the Kimberly-Clark mill in Niagara, Wisconsin.

Next is a report on bacteria.

I think it is desirable to lay a groundwork here, and I want to quote an excellent description by Mr. Kittrell as a general definition. "Municipal sewage" --

MR. STEIN: Pardon me. You have not identified Mr. Kittrell.

MR. WEST: Mr. Kittrell is the Chief of the Pollution Evaluation Unit of the Public Health Service Water Pollution Control Program, located in the Taft Sanitary Engineering Center, who has done a great deal of work on many of the streams in Tennessee and throughout the nation. He is a recognized expert on water pollution, and especially bacteriological work on streams.

Municipal sewage contains enormous numbers of bacteria which usually include the pathogenic bacteria in human excreta which can cause gastro-intestinal diseases, such as typhoid fever, diarrhea, and dysentery. These pathogenic bacteria, in densities too low to be detected by available laboratory methods, can cause illness in persons who swallow water containing them.

Sewage also contains bacteria of the coliform group, which typically occur in excreta, or feces, and can readily be detected even at low densities. In stream studies, involving sewage pollution, the numbers of these bacteria, though harmless in themselves, determined in river water samples, serve as indicators of the probable presence of pathogenic bacteria. The coliform bacteria also serve as indicators of the probable presence of other pathogenic organisms, such as viruses, which, in the absence of adequate laboratory methods at present, cannot be detected directly in the streams.

For many years the coliform test has been a principal tool used by sanitary engineers evaluating bacterial pollution of the streams. The coliform group has been used by numerous State and interstate water pollution control agencies as a basis for water quality objectives for various water uses. Unfortunately, the coliform group includes several types of bacteria which may come from sources other than excreta, and coliform data has sometimes been challenged on this basis.

In the last few years, a method for specific detection of fecal coliform bacteria, only, has been developed. Although this method has the decided advantage of specificity, it has not been used long enough to serve as a basis for quantitative water quality objectives.

Both methods of bacterial measurement were applied to all samples collected from the Upper Menominee and the Brule Rivers.

The results of both determinations are expressed in terms of the most probable numbers, or MPN, contained in 100 milliliters (ml) of water. 100 ml is a little less than one-half cup of water. The coliform group is usually designated as total coliforms, while the fecal coliform group is specifically designated as fecal coliforms.

Neither Michigan nor Wisconsin has adopted total coliform water quality objectives for swimming or general recreation. According to water quality guides and objectives most generally used by other State and interstate water pollution control agencies, water used for swimming and water contact sports should not average more than 1,000 MPN/100 ml total coliform bacteria, and those used for general recreation should not average more than 5,000 MPN/100 ml.

MR. PIERCE: Apparently Mr. West is reading from a prepared text, although this does not appear in the report, which included a long quotation from Mr. Kittrell.

I wonder if this could be made available to the conferees for examination?

MR. STEIN: Do you have copies?

MR. WEST: I have about three more.

MR. STEIN: Why don't you make it available?

MR. WEST: I will make it available. Now or later on?

MR. PIERCE: Now, please.

MR. WEST: Pardon?

MR. PIERCE: Now, please.

MR. WEST: These are identified as notes for oral presentation at the 1963 conference (handing same to Mr. Pierce).

MR. PIERCE: Thank you, sir.

MR. MC DERMOTT: Do you remember the page that Mr. Kittrell's definition appears on?

MR. WEST: I can give it to you. It is a new explanation replacing Page 28. These are referring to the original text.

MR. STEIN: Have the conferees located that?

MR. PIERCE: Yes.

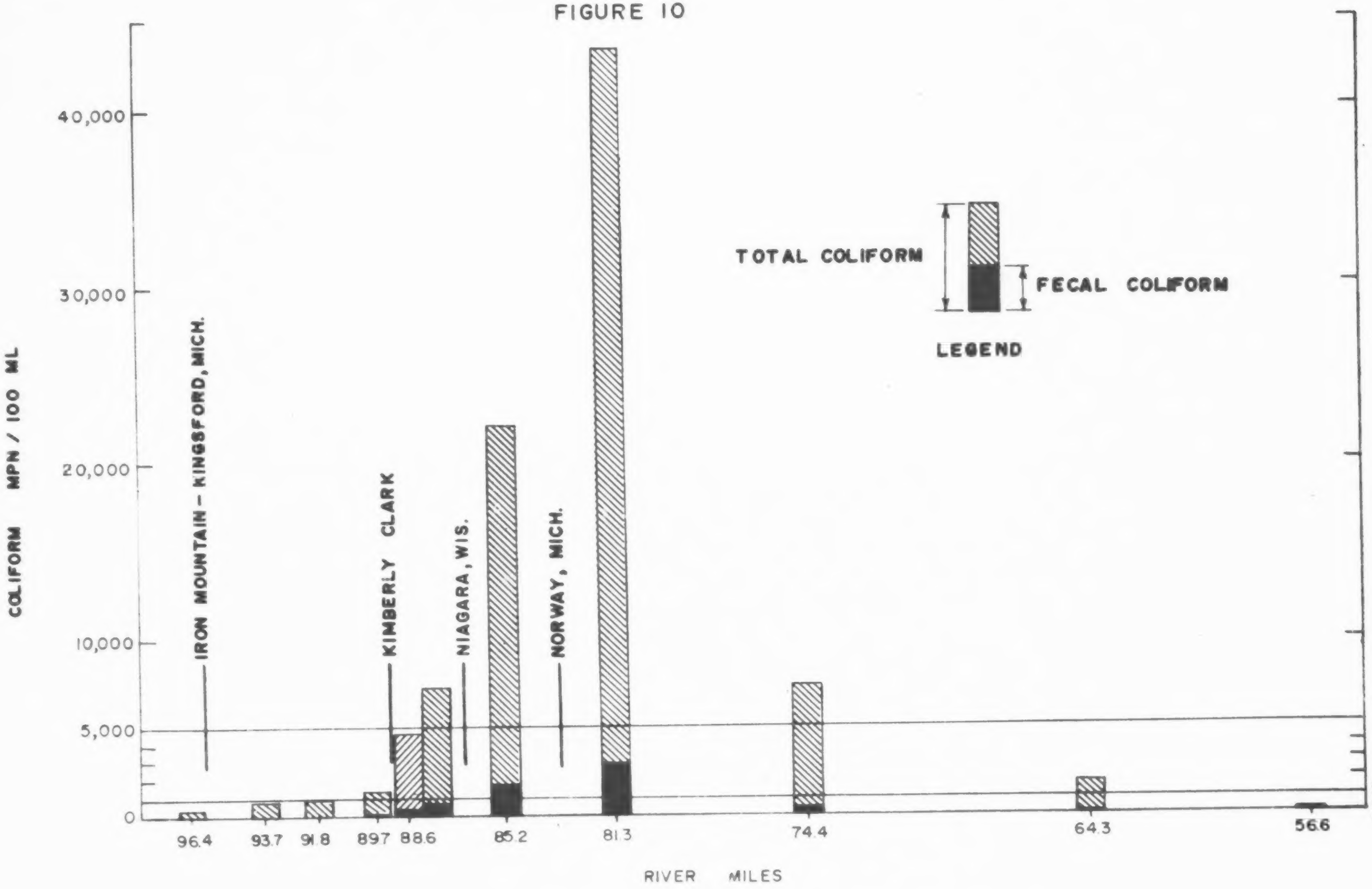
MR. MC DERMOTT: Yes.

MR. STEIN: Thank you. They have located it. You may proceed, Mr. West.

(Figure 10 is as follows:)

COLIFORM BACTERIA
UPPER MENOMINEE RIVER

FIGURE 10



A. W. West

MR. WEST: Now that the groundwork has been laid for coliform bacteria, we would like to discuss Figure 10, which is included in the report.

Kent, if you would set up Figure 10, please?

Figure 10 shows the symmetrical mean total coliform and fecal coliform densities in the Upper Menominee River during the August 1963 survey. The symmetrical mean total coliform density, determined by plotting all total coliform tests from each station on probability paper, is the value that was equaled or exceeded 50 percent of the time.

It should be noted that the straight arithmetic average is generally used in comparing stream data with bacterial water quality objectives. The arithmetic average invariably exceeds the symmetrical mean, but it is felt that the more conservative symmetrical mean is a more nearly representative value when dealing with the relatively limited number of samples available for this report. Both symmetrical means and arithmetic averages are cited subsequently at critical points on the streams.

Total coliform densities increased from 340 MPN/100 ml above Iron Mountain-Kingsford (M-96.4) to 900 MPN/100 ml at the U. S. Highway 2 bridge (M-91.8), some 4-½ miles below the treatment plant outfall. Fecal coliform densities increased from 340 MPN/100 ml above Iron Mountain-Kingsford (M-96.4) to 900 MPN/100 ml at the U. S. Highway 2 bridge (M-91.8), some 4-½ miles below the treatment plant outfall. Fecal coliform concentrations increased from 21 to 60 in this same reach. Bacterial quality of the Menominee River below the Iron Mountain-Kingsford sewage treatment plant meets the objectives for swimming and general recreational use.

A local sewer, at the Highway 2 bridge, and a flume from the pulp mill hot pond enter the river above the power plant intake at the Kimberly-Clark power dam in Niagara, Wisconsin (M-89.7), where the total coliform densities increased to 1,390 and fecal coliform densities increased to 97.

About one mile below the Kimberly-Clark mill (M-88.6), but above the outfall from the Niagara, Wisconsin, sewage treatment plant, the total coliform densities increased to 4,600 on the Michigan side and 7,300 on the Wisconsin side of the river, and the fecal coliform densities increased to 195 and 870 at these two sampling stations. This significant increase, especially in the fecal coliform count, indicates that some domestic sewage may bypass the municipal sewers and enter the river directly, or that sewage from some other undetermined source may be involved.

Now, going downstream, at the U. S. Highway 8 bridge (85.2), about three miles below the Niagara treatment plant outfall, wastes are mixed throughout the Michigan and Wisconsin waters of the entire stream cross-section and the mean total coliform density increased to 22,100 and the fecal coliform density increased to 1,890 MPN/100 ml.

Untreated sewage from Norway, Michigan, is discharged into Sewer Creek about 2.4 miles above its confluence with the Menominee River Sewer Creek, entering the Menominee River about two miles below the previous sampling station at the U. S. Highway 8 bridge, contained approximately 415,000 MPN/100 ml total coliform and 120,000 MPN/100 ml fecal coliform 0.6 miles above its mouth.

This additional bacterial load from the Norway sewage along with the growth of bacteria discharged from the Niagara area increased the total coliform densities to 43,500 MPN/100 ml and the fecal coliform to 3,000 MPN/100 ml in the pool above the Niagara power dam, which is located about 7 miles below the entrance of Sewer Creek. At this station, the arithmetic averages of total and fecal coliform densities were 70,200 and 5,100 MPN/100 ml respectively.

Although the coliforms started to die off after reaching this peak, the symmetrical mean total coliform densities remained above the 5,000 general recreational objective at the Faithorn sampling station and above the 1,000 swimming and water contact sports objective downstream to County Trunk Z, some 25 miles below Niagara.

Although the proportionate load from each of the two sources has not been determined, bacterial pollution of the Upper Menominee River is caused principally by raw and treated sewage discharges from Norway, Michigan, and Niagara, Wisconsin.

Now we will wind up the Upper Menominee with a discussion of what we found here.

The adverse effects of pollution are vividly revealed by the interrelated changes in the physical, chemical, biological and bacterial quality of the Upper Menominee River.

The B.O.D. of the river water increased sharply immediately below the main organic waste discharge from Kimberly-Clark, and then subsided downstream as the oxygen demand of the wastes was satisfied.

In satisfying this demand, dissolved oxygen was removed from the river water, and the downstream D.O. concentrations were progressively reduced to extremely low levels considered critical to fish life.

Moderate numbers of many desirable kinds of fish food organisms were observed on the river bottom above the sources of pollution. Below the solids waste discharges, large numbers of only a few kinds of pollution-tolerant organisms, unsuitable for fish food, were found. Floating and suspended solids degraded the appearance of the river and settled solids covered fish spawning areas.

Coliform bacterial densities remained satisfactory in the upstream clean water areas and below the Iron Mountain-Kingsford sewage treatment plant, where effective two-stage, pre- and post-, chlorination facilities are employed.

Below the Norway raw sewage, and the Niagara treated sewage, which was not completely disinfected, total coliform densities in the river increased to levels exceeding the limits considered satisfactory for water contact sports and general recreation. And, most significantly, the probable presence of other sewage-associated organisms in the river water was confirmed by a corresponding increase in the densities of the more specific fecal coliform organisms.

The total picture is that of an abused, polluted stream.

MR. PIERCE: Mr. Chairman.

MR. STEIN: Yes.

MR. PIERCE: I should like to call your attention to the fact that there is, in many instances here, quite a difference, quite a variation in the interpretations as appearing in the report and as presented here in this oral presentation of Mr. West.

The question that I would ask is whether the report stands in the record, or whether Mr. West's interpretations, where there are differences, stand in the record.

MR. WEST: The report stands in the record

Being so close, I am not aware that I have shown any different interpretation in the oral presentation. I have tried to condense and use different language for oral presentation than a written document, where you can read, study and re-read. I am sorry; there is no different interpretation meant.

MR. STEIN: Pardon me, Mr. West.

I think, as we indicated, the record will show the report as read. This is supposed to be the presentation before the group.

Now, if there is any feeling that there is any difference in the presentation, I think you may want to ask Mr. West about that specifically for clarification, because, as I understood this, the written report would be the guiding document. As we had indicated here -- and this goes beyond the question that was raised at the beginning -- we presented the basis of the Government's statement to the water pollution control agencies of both States about a month before the conference, and I wouldn't expect that there were any changes in the ground rules with the presentation.

There were some modifications, I know, based on review of both States, but I would not imagine that unilaterally this would be changed in an oral presentation.

MR. WEST: I didn't expect any changes -- I mean, I don't think so. Furthermore, when I come to the summaries and conclusions, they are direct quotes from the original report.

MR. PIERCE: If it should appear upon careful examination and study of the report and the oral presentation here, in the transcript with which I understand the conferees will be furnished -- if later on it appears that there is a real difference in the opinions expressed or in the facts, I presume that the conferees could reconcile those differences?

MR. STEIN: May we go off the record for a moment?

(Discussion off the record.)

MR. PIERCE: I have just one more comment on this, one case in point.

Would Mr. West inform us where in the prepared text the last statement that he read from his oral notes may be found, where it says, "The total picture is that of an abused, polluted stream"?

MR. WEST: That is a new statement. I mean, in summarizing, I have a new summary of this. It is a polluted stream. This report shows that.

MR. PIERCE: I don't think that this is quite fair, sir, to give a new interpretation and, at the same time, claim that there are no real differences intended in what you are stating here and what is in the report.

I consider this quite a difference.

MR. WEST: Well, I am making this statement at the conference, and I believe you will find it will be substantiated again by the summary and conclusions, which will be a direct verbatim reference to the original report.

MR. PIERCE: Thank you.

MR. STEIN: Mr. West, will you continue, please?

MR. WEST: All right.

We now come to a new section of the stream and discuss the Lower Menominee River, and here is the figure, starting off with sources of wastes --

MR. STEIN: Are you taking another section of the river?

MR. WEST: Yes, sir.

MR. STEIN: Let us take a ten-minute break and we will stretch.

I might indicate to you the plans that we are going to follow. We will recess at twelve until two, if we can arrange it.

We stand in recess for ten minutes.

(Whereupon a recess was had.)

MR. STEIN: May we reconvene?

I would suggest, if any of you have difficulty hearing in any part of the hall, as I have been told that there has been some difficulty this morning, why don't you people just raise your hands and then we can get the speaker, whoever it is, including myself, to speak a little louder.

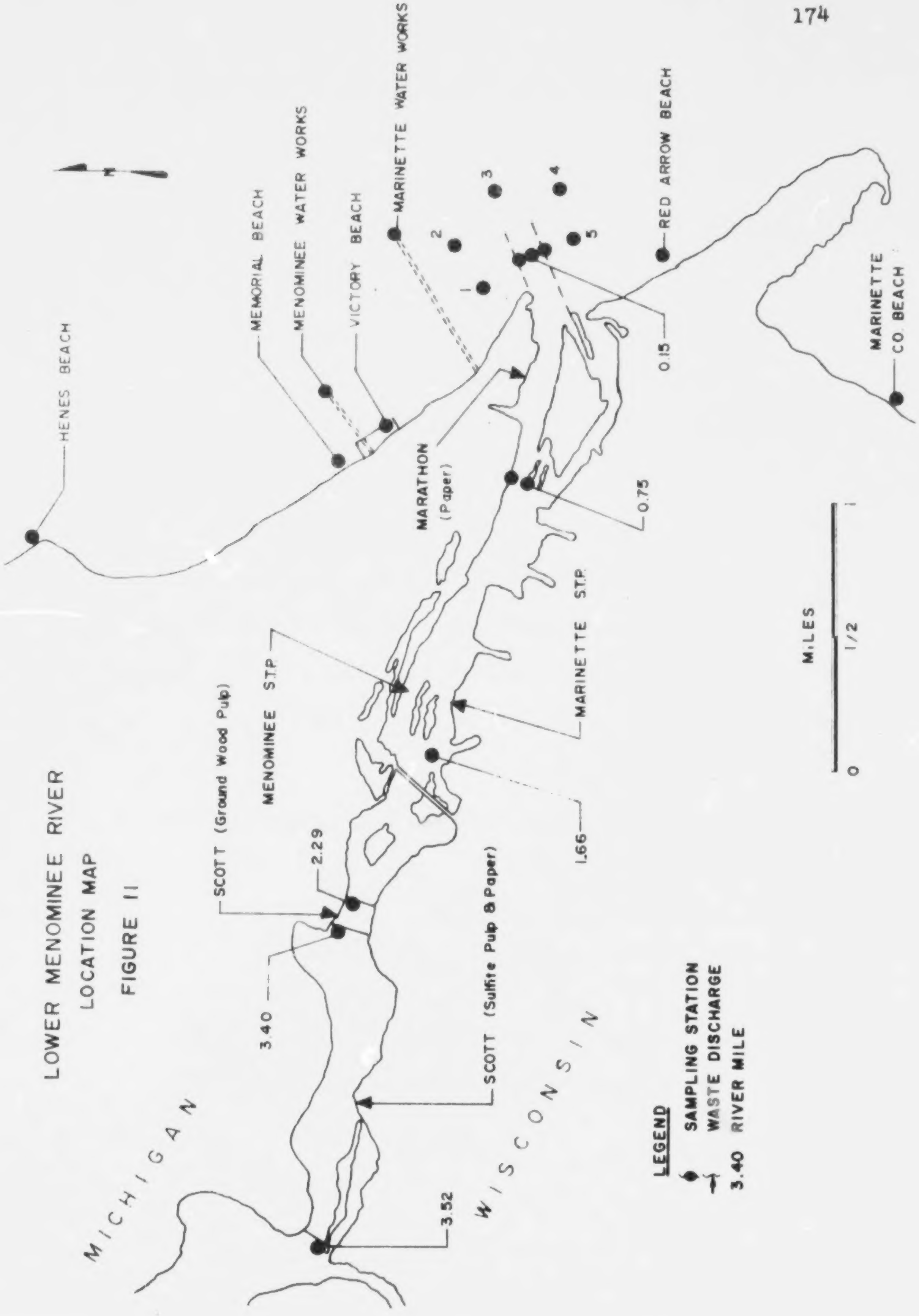
All right, Mr. West.

MR. WEST: Thank you.

Continuing, we start the new section on the Lower Menominee River survey.

(Figure 11 is as follows:)

LOWER MENOMINEE RIVER
LOCATION MAP
FIGURE 11


MICHIGAN
WISCONSIN
HENES BEACH
MEMORIAL BEACH
MENOMINEE WATER WORKS
VICTORY BEACH
MARINETTE WATER WORKS
1
2
3
4
5
RED ARROW BEACH
MARINETTE CO. BEACH
0.15
0.75
1.66
2.29
3.40
3.52
MARATHON (Paper)
MARINETTE S.T.P.
MENOMINEE S.T.P.
SCOTT (Ground Wood Pulp)
SCOTT (Sulfite Pulp & Paper)
MILES
0
1/2
1
LEGEND
● SAMPLING STATION
→ WASTE DISCHARGE
3.40 RIVER MILE

A. W. West

MR. WEST: The sources of wastes discharged to the Lower Menominee River are shown on Figure 11.

Menominee, Michigan

Menominee, Michigan, with a sewered population of 11,280, operates a primary sewage treatment plant with two-stage, pre- and post- chlorination facilities. Treated sewage enters the north side of the river at Mile 1.6.

Marinette, Wisconsin

Marinette, Wisconsin, with a sewered population of 13,000, operates a primary sewage treatment plant with single-stage chlorination. Treated sewage enters the south side of the river at Mile 1.6.

Combined storm and sanitary sewers serve areas in both these communities. During periods of excessive rainfall, some of the raw sewage and accumulated sludges and slimes are flushed out of the sewers, around the sewage treatment facilities, and directly into the river.

Scott Corporation - Marinette, Wisconsin

The Scott paper mill in Marinette, Wisconsin, produced approximately 48.4 tons of sulfite pulp and 153.3 tons of tissue paper products per day. Fiber recovery systems are provided and a portion of the concentrated waste sulfite liquor is hauled away from the mill for use as road binder. All other wastes are discharged to the Lower Menominee River between the upper and lower dam at Mile 3.1.

Scott Pulp Mill - Menominee, Michigan

The Scott Pulp Mill in Menominee, Michigan, produced 17.3 tons of groundwood pulp per day. Fiber recovery systems are provided and all other wastes are discharged into the river below the lower dam at Mile 2.4.

Marathon Division of American Can Co. - Menominee, Michigan

The Marathon paper mill in Menominee, Michigan, imported pulp and produced 270 tons of solid bleach board and 47.5 tons of tissue and wax paper per day. Fiber recovery systems are provided and all other wastes are discharged to the river about one-half mile above the mouth.

(Table 3 and Figure 12 -- corrected copies -- are as follows:)

TABLE 3

CORRECTED COPY
(8-24-63 Revision)

SOURCES OF WASTES

Estimated Net Loads to Lower Menominee River

August, 1963

SOURCE	ORGANIC WASTES (5 Day BOD)		SOLIDS WASTES (Vol. Susp. Solids)	
	Population Equivalents	% of Total	Tons/ Day	% of Total
SCOTT PAPER CO.(1) Marinette, Wisconsin (Fiber recovery, hauling for road binder)	197,000	80.6	3.5	38.9
MARINETTE, WISCONSIN(2) Municipal and Industrial Wastes (Primary Treatment single stage chlorination)	10,000	4.1	0.5	5.6
MENOMINEE, MICHIGAN(3) (Primary Treatment, with pre- and postchlorination)	7,300	3.0	0.3	3.3
SCOTT PAPER CO.(4) Menominee, Michigan (Fiber recovery)	4,700	1.9	2.2	24.4
AMERICAN CAN CO.(4) Marathon Div. - Paper Menominee, Michigan (Fiber recovery)	25,500	10.4	2.5	27.8
TOTAL -	244,500	100.0	9.0	100.0

---

(1) Calculated from production figures from Scott and unit loss value from Wisconsin survey data.

(2) P.E. from 1963 rough draft for Revised 1960 Summary Report. Solids calculated from P.E. estimates and avg. reductions.

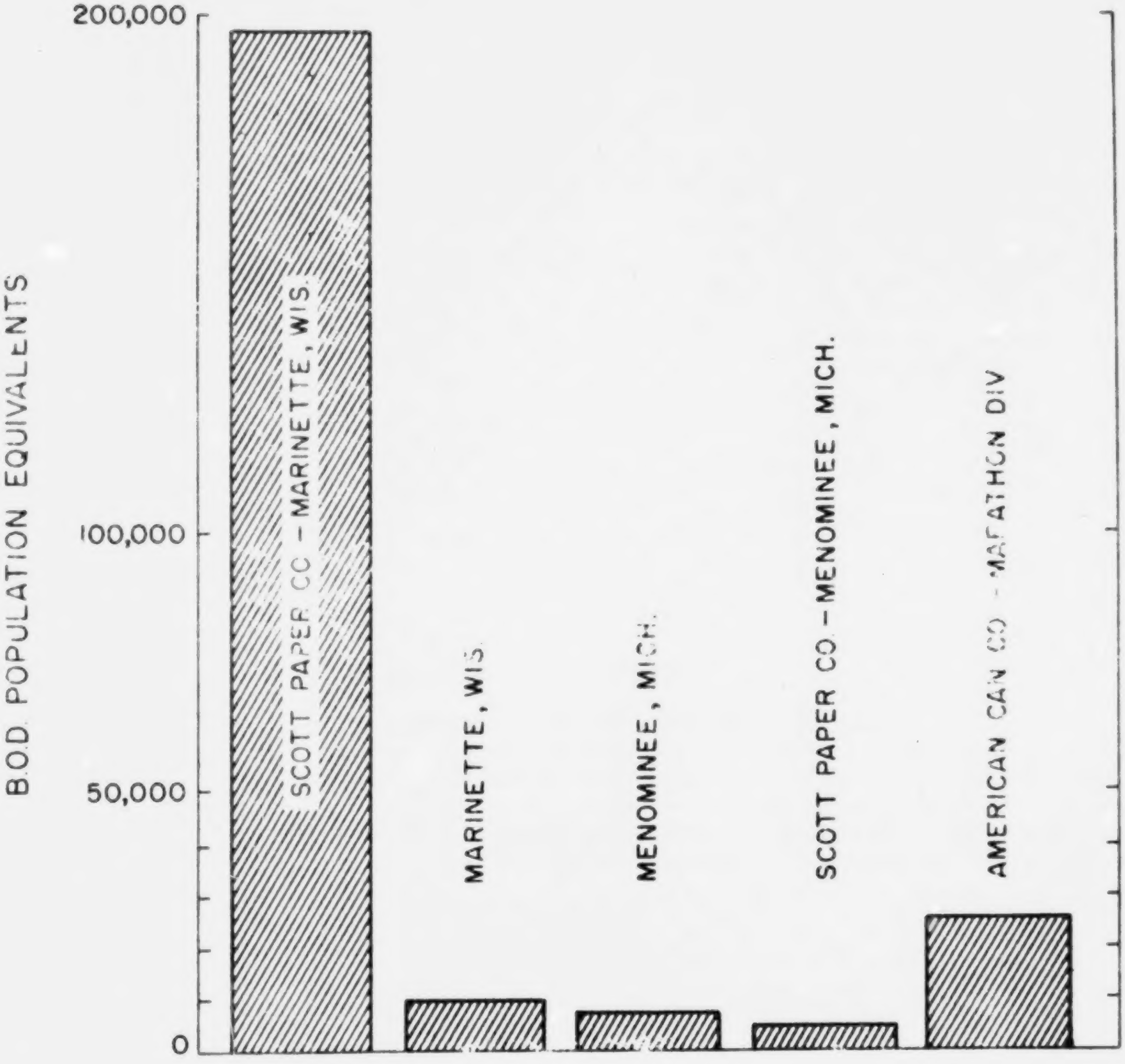
(3) P.E. from 1963 rough draft for Revised 1960 Summary Report. Solids from plant data.

(4) Calculated from production figures from Scott and American Can; and unit losses from Michigan 1963 surveys.

SOURCES OF WASTES
B.O.D. POPULATION EQUIVALENTS
LOWER MENOMINEE RIVER

FIGURE 12

CORRECTED COPY



MR. WEST: Now, if we may have Figure 12, please?

SOURCES OF WASTES

Organic Wastes

The estimated amounts of organic wastes entering the Lower Menominee River are shown on Figure 12. Approximately 197,000 population equivalents, or 81 percent of the total organic wastes loading entering the Lower Menominee River, was discharged by the Scott pulp and paper mill in Marinette, Wisconsin, and approximately 25,500 population equivalents, or 10 percent of the total, was discharged by the Marathon paper mill in Menominee, Michigan. The remaining 9 percent of the total organic load was included in the combined discharges from the sewage treatment plants in Menominee and Marinette and the Scott groundwood mill in Menominee, Michigan.

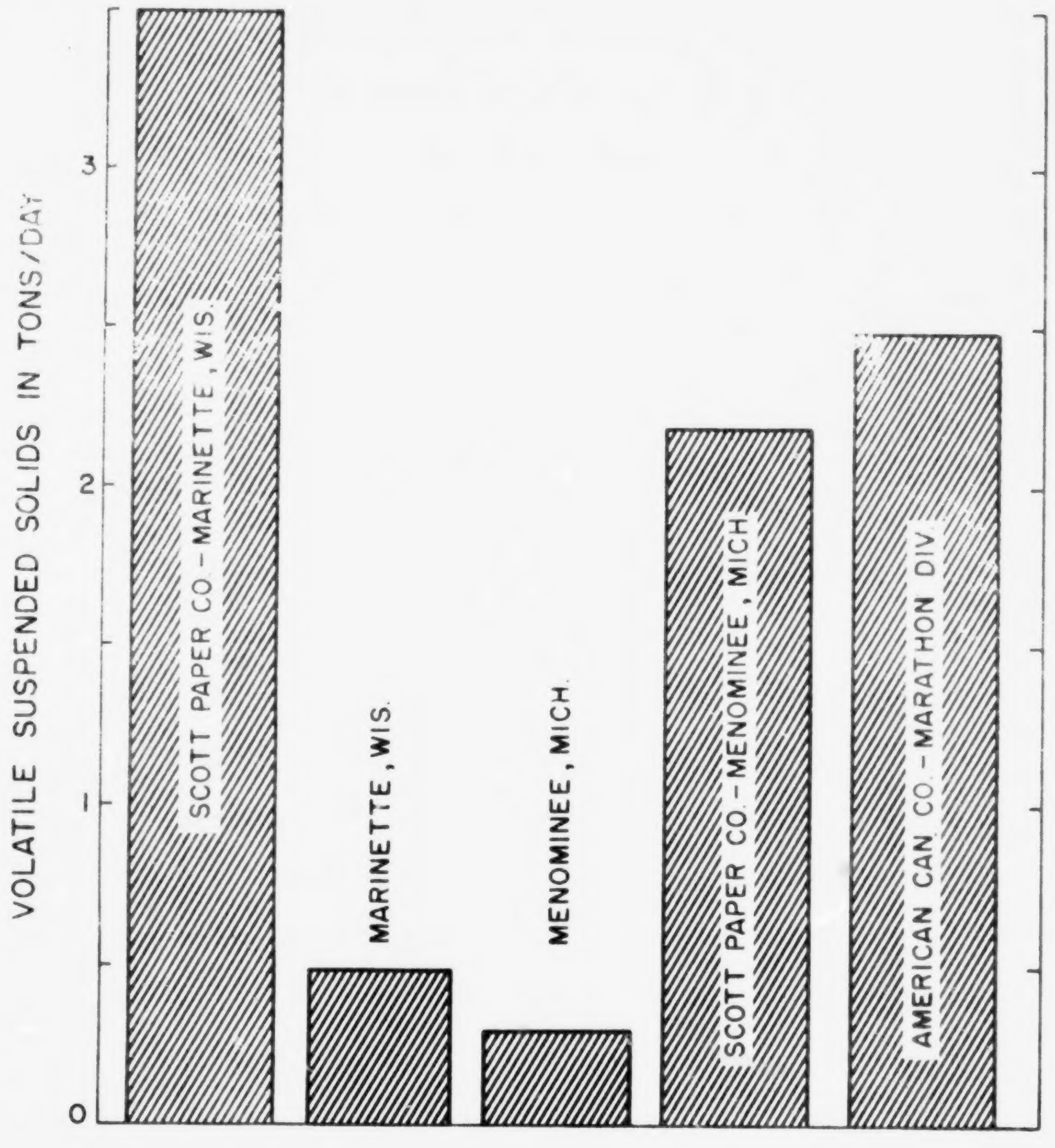
The Scott mills discharge approximately 32,000 pounds of B.O.D., which is about 16 tons per day, whereas the Marathon discharges approximately 4,000 pounds of B.O.D. per day, or two tons per day, again representing 10 percent of the total organic load discharged into the river.

Now, if we may have the next figure, please?

(Figure 13 -- corrected copy -- is as follows:)

CORRECTED COPY

SOURCES OF WASTES
VOLATILE SUSPENDED SOLIDS
LOWER MENOMINEE RIVER
FIGURE 13



MR. WEST: Solids Wastes.

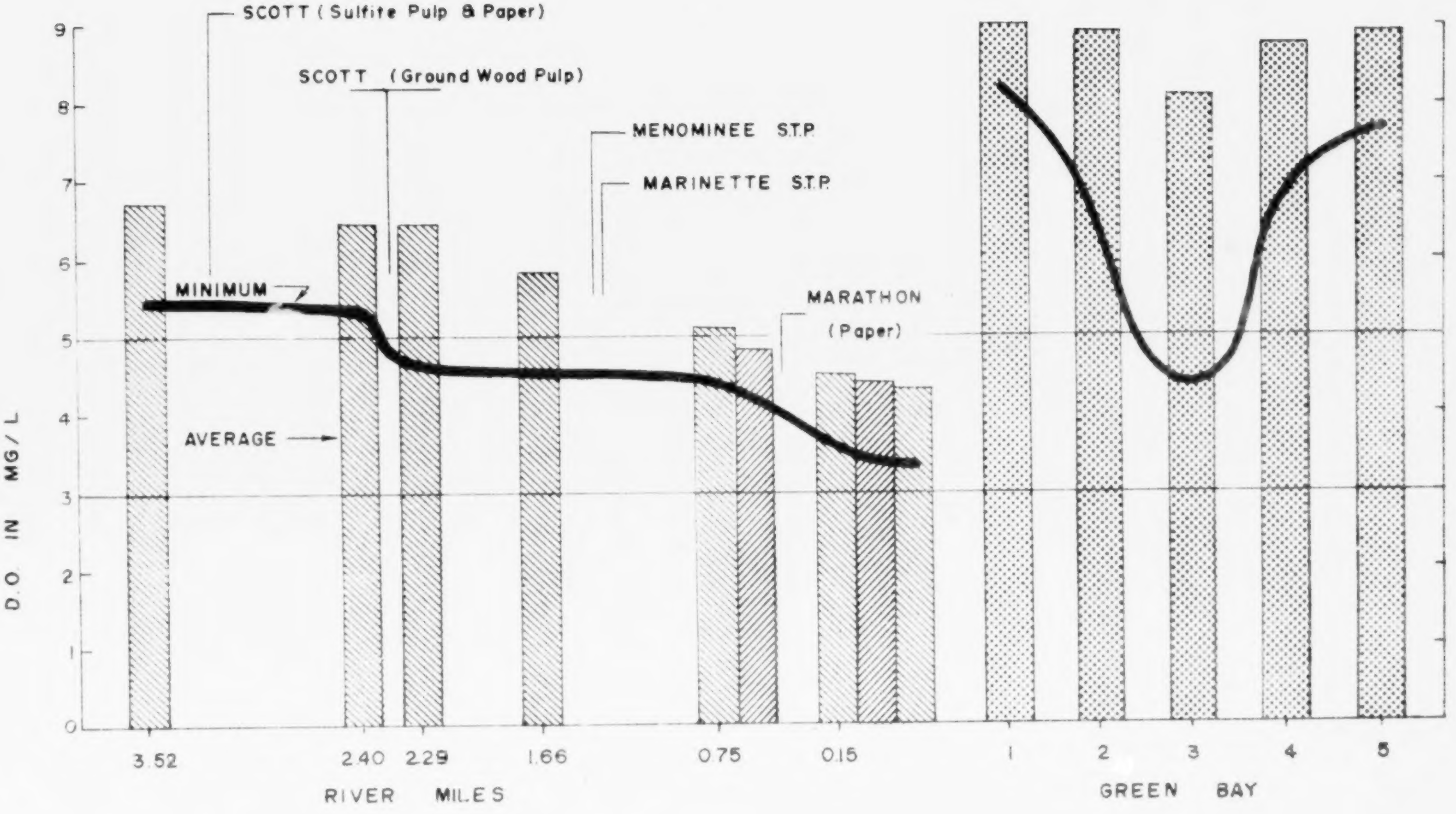
The estimated amounts of solids wastes entering the Lower Menominee River are shown on Figure 13. Approximately 91 percent of the volatile suspended solids were discharged by the pulp and paper mills and the remaining 9 percent by the two sewage treatment plants. Approximately 3-½ tons per day, or 39 percent of the total load, was discharged by the Scott paper mill in Marinette, Wisconsin; approximately 2-½ tons per day, or 28 percent of the total, by the Marathon paper mill in Menominee, Michigan; and approximately 2.2 tons per day, or 24 percent of the total, by the Scott groundwood mill in Menominee, Michigan.

(Figure No. 14 is as follows:)

DISSOLVED OXYGEN

LOWER MENOMINEE RIVER

FIGURE 14



MR. WEST: Next we come to another figure, Figure 14.

EFFECTS ON WATER QUALITY

Dissolved Oxygen

The average dissolved oxygen concentrations in the Lower Menominee River are shown on Figure 14. The dissolved oxygen averaged 6.7 above the waste sources (M-3.52), 5.8 milligrams per liter below the Scott mills (M-1.66), 5.0 milligrams per liter below the sewage treatment plants (M-0.75), and 4.4 milligrams per liter below the Marathon paper mill (M-0.15), and ranged from 8.1 to 9.0 in the five stations in Green Bay. The minimum values were 3.6 between the sewage treatment plants and the Marathon mill, and 3.4 in the channel at the mouth below the Marathon mill.

Although the minimum dissolved oxygen concentrations remained above the 3 mg/1 level, considered critical to fish life by the State of Wisconsin, the organic waste loadings discharged to the Lower Menominee River depressed the average dissolved oxygen concentrations below the 5 mg/1 level at river mile 0.15 near the mouth of the river.

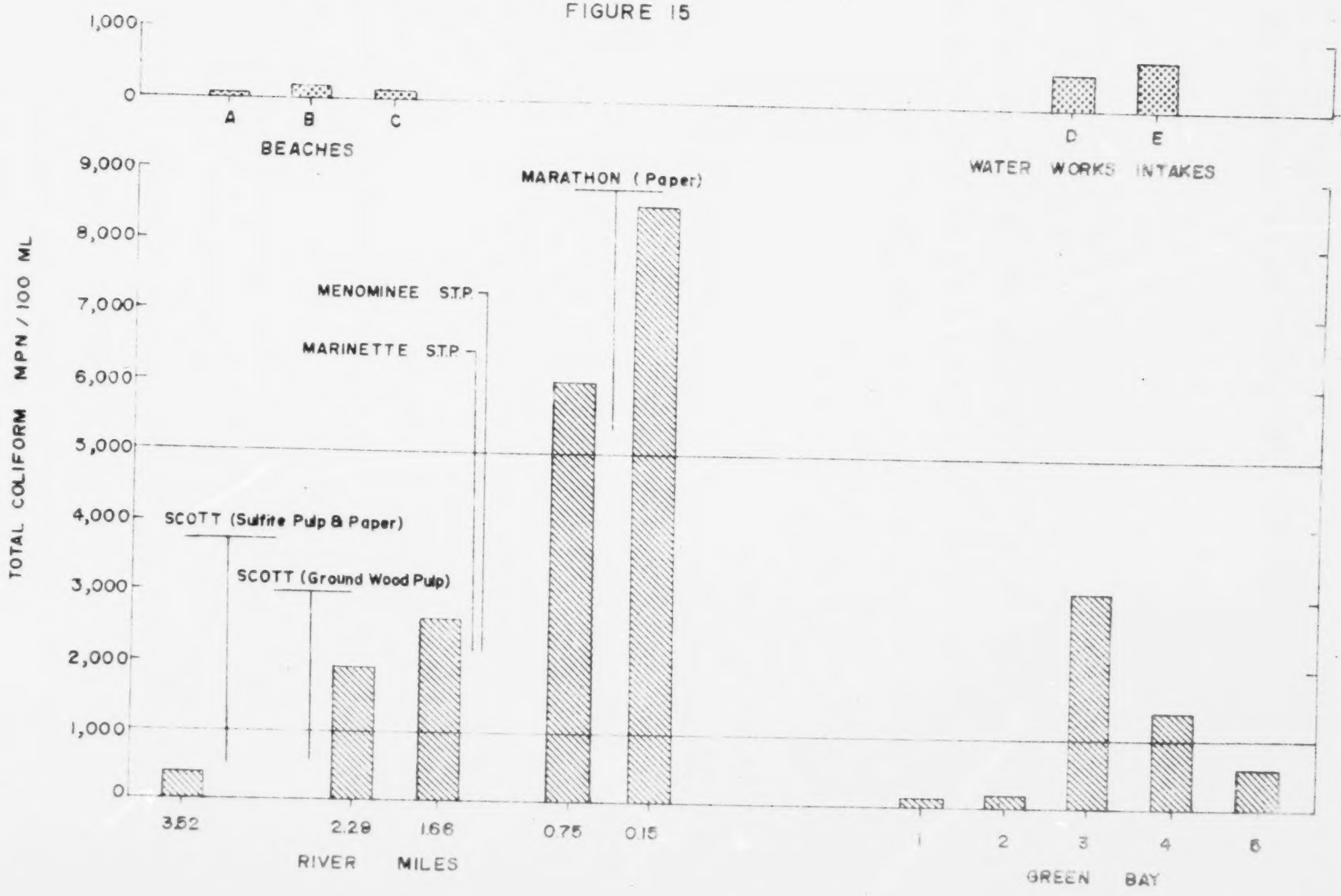
Going on to suspended solids: Average suspended solids concentrations in the river increased from 6.1 mg/1 above the upper dam (M-3.52) to 8.9 mg/1 at the Hattie Street bridge (M-2.29) below the Scott mills. Samples collected from the station between the sewage treatment plants and the Marathon paper mill (M-0.75) averaged 4.75 and increased to 5.3 at the mouth below the Marathon mill (M-0.15). Except for a 6.2 value at the northeasterly sampling station, samples collected from four out of five of the Green Bay stations averaged 3.3 mg/1.

The above averages represent 26 samples collected twice daily at each station. On Wednesday, August 8th, 1963, the suspended solids concentrations in samples collected from each of the two sample stations (M-2.29 and M-1.66) located between the Scott groundwood mill and the sewage plant outfalls increased sharply to 40 mg/1 in the morning and 25 mg/1 about noon. Suspended solids concentrations in the river above the upper dam averaged 5-½ mg/1 and the Menominee River discharge at the Grand Rapids Dam was recorded at 1,392 cfs. On this day, solid wastes were discharged into the Lower Menominee River, upstream from the sewage treatment plant outfalls, at rates of 130 tons per day in the morning and 73 tons per day at noon.

(Figure No. 15 is as follows:)

COLIFORM BACTERIA
LOWER MENOMINEE RIVER

FIGURE 15



MR. WEST: Kent, will you set up Figure 15, please?

Coliform Bacteria

During the August 1963 survey, the bacterial quality of the water in the Menominee River upstream from the Scott Company's upper dam and at the water works intakes and the beaches in Green Bay proper was satisfactory.

The symmetrical mean total coliform densities were increased to 2,600 MPN/100 ml in the reach between the Scott groundwood pulp mill and the Menominee and Marinette sewage treatment works. These densities were further increased to 6,000 MPN/100 ml below the sewage treatment plant outfalls and 8,500 MPN/100 ml at the last river station 0.15 miles above the mouth of the river. At this last river station the arithmetic average of the coliform densities was 15,200 MPN/100 ml.

Effluent from the Menominee, Michigan, sewage treatment plant contained about 900 total coliforms per 100 ml. Effluent from the Marinette, Wisconsin, sewage treatment plant enters the river through two outfalls which contained 7,600 and 260,000 coliforms per 100 ml respectively.

The symmetrical mean total coliform densities in the Menominee River below the sewage treatment plant outfalls increased slightly above the 5,000 MPN/100 ml level considered satisfactory for general recreational use. The survey data indicated that the effluents from the Marinette, Wisconsin, sewage treatment plant were the principal sources of this bacterial pollution.

Now we go on to biology.

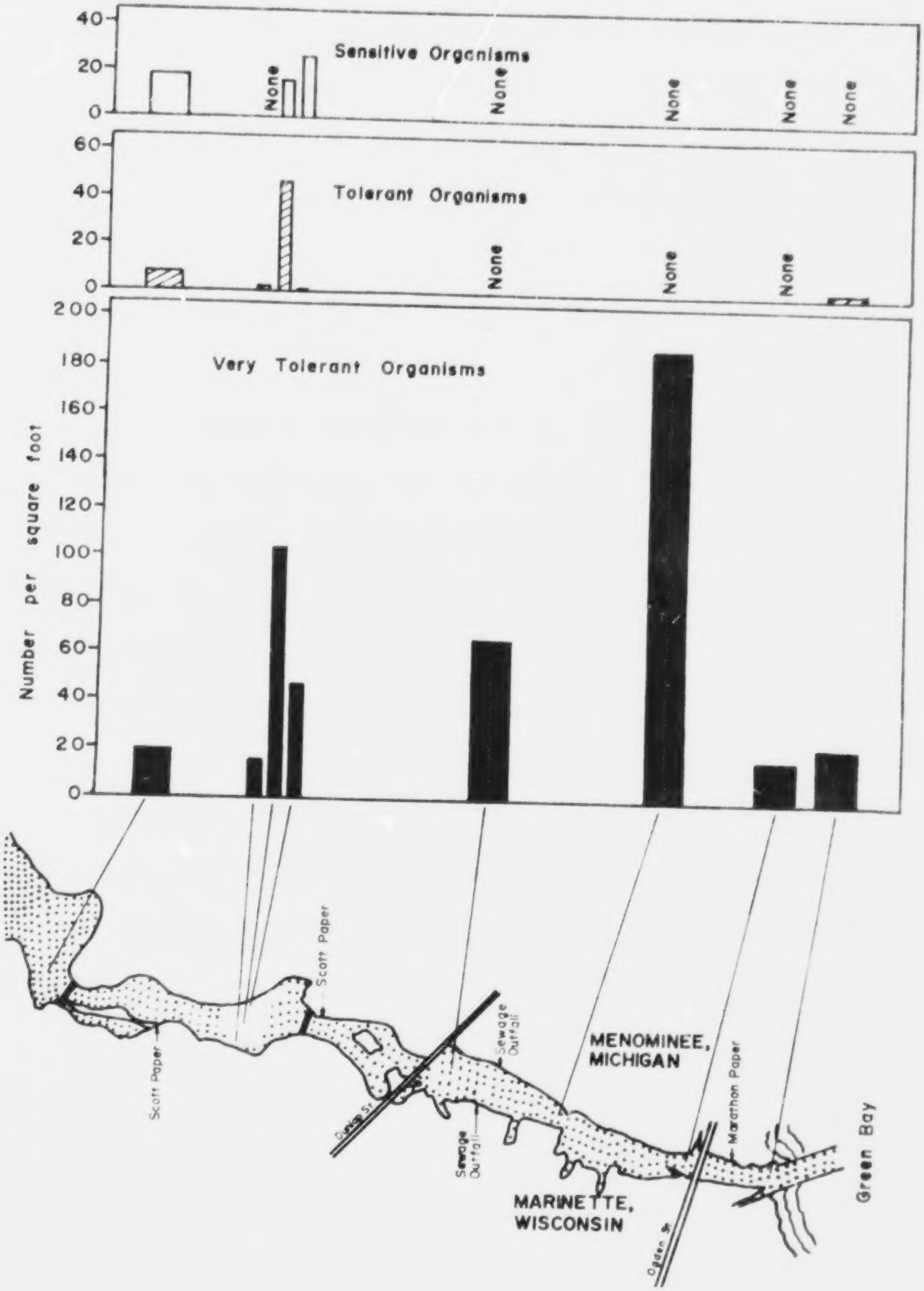
Past Studies

A 1961 report by the Wisconsin Committee on Water Pollution describes wood fiber, wood chip and slime bacterial pollution of the Lower Menominee River.

A report by the Michigan Water Resources Commission, dated August 24, 1961, discusses the fish taste tests performed on Menominee River fish in the region of Menominee-Marinette. Of six Menominee River walleyes tasted, one was judged as good, two as fairly good, one just acceptable, and two as nonacceptable. Conservation officers in both Michigan and Wisconsin indicate that complaints have been received on off-flavor in fish caught from the Lower Menominee River in the reach polluted with paper mill effluent.

(Figure No. 16 is as follows:)

Figure 16. Populations of bottom organisms—lower Menominee River, August, 1963.



MR. WEST: Now we are going into the biological section of the study.

Bottom samples on the Lower Menominee River, in the vicinity of Menominee, Michigan - Marinette, Wisconsin, were taken from just above the upper dam to the mouth of the river (Figure 16). A bottom-dwelling community normally associated with an unpolluted flowage habitat was found at the upstream sampling site. Below the Scott Paper Company, Marinette, Wisconsin, but above the lower dam, samples across the river showed a drastic change in bottom life between the Wisconsin side, receiving effluent from the mill, and the Michigan side. On the Wisconsin side, accumulated sludge deposits were composed of wood chips, fibers and slime bacteria. On occasion, masses of this material would boil to the surface of the water, create unsightly conditions, gradually disperse, and float downstream to reform a sludge deposit. Bottom-dwelling organisms were limited only to very tolerant forms, and because of adverse bottom conditions, these occurred in small numbers, indicating very polluted conditions. Near the center of the river very tolerant sludgeworms and midges attained high populations, but at the same time, sensitive burrowing mayflies were able to exist in a population of 15 per square foot. This zone of the river may be termed moderately polluted. On the

Michigan side of the river the bottom organisms population was quite similar to that encountered above the upper dam -- a clean water area.

Below the lower dam, bottom samples indicated mixing of the mill wastes across the river, in both Michigan and Wisconsin waters. Wood fibers and slime bacteria were found intermingled with bottom deposits to the river's mouth. Only very tolerant organisms were able to survive severely degraded bottom conditions in this environment. The population of these was increased below the sewage treatment plant outfalls, because of the increased food supply, and diminished near the mouth of the river because of septic bottom conditions. Samples below Marathon Paper Company revealed extensive sludge deposits and few organisms because of severely polluted conditions. Floating solids were present. On the Wisconsin side at this point the sludge had a strong hydrogen sulfide odor and contained yellow particles of elemental sulphur. A sulphur pile was noted on the docks upstream.

The Menominee River is degraded below the Scott Paper Company at Marinette, Wisconsin, to its mouth, a distance of three miles, as indicated by the presence of wood chips, wood fibers, and slime bacteria, and the elimination of sensitive bottom-dwelling organisms. Near the river's mouth, bottom conditions were so polluted that only a few organisms of any type could survive. Fish food has been eliminated.

Marina operators reported that solids and slimes in the river foul motor boat cooling systems. Suspended solids, fibers, bacterial slimes and patches of floating septic sludge degraded the appearance of the river and reduced the esthetic appeal of the Lower Menominee River for general recreational use.

Now, if we can go on to --

MR. STEIN: Just a moment, please.

MR. SCHNEIDER: Mr. Chairman?

MR. STEIN: Yes, Mr. Schneider.

MR. SCHNEIDER: Mr. West, I noted on the report on the Lower Menominee that there was no data on fecal coliform, and I wonder if you can explain why they were run on the upper portion and not on the lower?

MR. WEST: We had two crews on the Upper Menominee River. On the Upper Menominee we had the group from our Cincinnati station, with whom we worked day in and day out, and they used the multiple tube solution technique for total coliforms and for fecal coliforms.

In the Chicago group that did the work on the Lower Menominee, they used the filter technique, and attempted to run both coliform and fecal coliform bacteria. The fecal coliform bacteria are reported.

They only ran a few -- I forget how many -- possibly less than 25 percent of the samples of the fecal coliform, and then because of other debris included and reflected by this membrane filter, they were not sure of the fecal coliform data. Instead of trying to report on and analyze data that we were not sure of, we just left that part out of it and we talked only on the total coliform.

We wish we had good, substantiable fecal coliform down there to conform right along with the rest of this coliform report.

MR. SCHNEIDER: Thank you.

(Table No. 4 and Figure 17 are as follows:)

TABLE 4

SOURCES OF WASTES

Estimated Loads to the Tributaries of the Brule River

August, 1963

SOURCE	ORGANIC WASTES (5-Day BOD)	
	Population Equivalents	% of Total
DOMESTIC WASTES		
Iron River, Michigan(1) (Primary Treatment with chlorination)	1,400	42
Stambaugh, Michigan(1) (Secondary Treatment with chlorination)	140	4
Caspian, Michigan(2) (Primary Treatment - Imhoff Tank)	1,040	31
Gaastra, Michigan(2) (Primary Treatment - Septic Tanks)	465	14
Florence, Wisconsin(2) Domestic + Cheese Plant Wastes. (Secondary Treatment - Stabilization Pond)	300	9
	3,345	100
IRON MINE DEWATERING(3)		
Homer-Wauseca Mine	-	-
Sherwood Mine	-	-
Hiawatha #1 Mine	-	-
Hiawatha #2 Mine	-	-

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(1) Data from Aug. of 1962 Sewage Treatment Plant Reports.

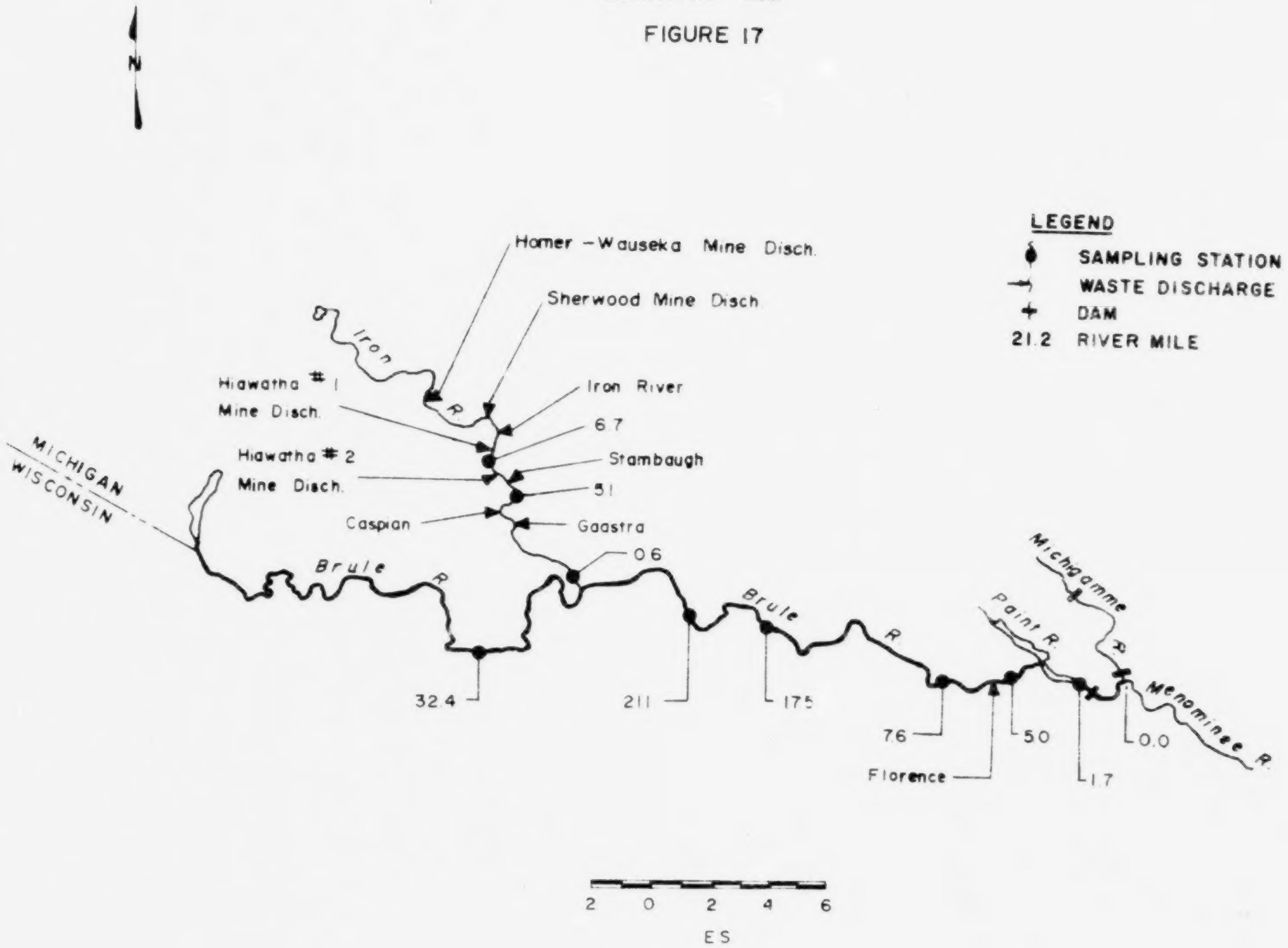
(2) P.E. from 1963 rough draft for Revised 1960 Summary Report.

(3) Acid Iron-Bearing Mine Wastes cannot be equated in terms of BOD Population Equivalents. Amount of Iron and Acid not measured at Source.

BRULE RIVER

LOCATION MAP

FIGURE 17


N
LEGEND
● SAMPLING STATION
→ WASTE DISCHARGE
+ DAM
21.2 RIVER MILE
Homer - Wauseka Mine Disch.
Sherwood Mine Disch.
Iron River
6.7
Stambaugh
5.1
Gaastra
0.6
Hiawatha # 1 Mine Disch.
Hiawatha # 2 Mine Disch.
Caspian
Iron R.
MICHIGAN
WISCONSIN
Brule R.
32.4
21.1
Brule R.
17.5
7.6
Florence
5.0
1.7
0.0
Paint R.
Michigamme R.
Menominee R.
2 0 2 4 6
ES

MR. WEST: Now will you set up the figure for the Brule River, the last section of our report?

SOURCES OF WASTES

The sources of wastes entering the Brule River are shown on Figure 17.

Within the reach between five and eight miles from the mouth of the Iron River, four communities, namely, Iron River, Stambaugh, Caspian, and Gaastra, Michigan, with a total sewered population of 6,600, discharge municipal sewage after varying degrees of treatment. Iron River provides primary treatment and chlorination, and Stambaugh provides secondary treatment plus chlorination. Caspian and Gaastra have inadequate sedimentation facilities and do not provide chlorination. Drainage from four iron mines, three of which have settling ponds, also enters the Iron River in this general vicinity. The Iron River, containing the residual loads from these waste discharges, enters the interstate waters of the Brule River approximately 26-½ miles above the point where the Brule and the Michigamme join to form the Menominee River.

Florence, Wisconsin, with a sewered population of 1,514, provides secondary treatment in the form of a sewage stabilization pond and the treated sewage enters the

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Brule River about 5-½ miles above its confluence with the Menominee.

EFFECTS ON WATER QUALITY

Iron

Gross pollution of the Iron and Brule River by acid mine drainage from the Homer-Wauseca Mines in 1962 has been corrected.

Although the severe damaging effects of 1962 have been minimized, the August 1963 waste discharges from the four mines still caused some turbidity in the stream. Turbidity of the upper Brule above Iron River (B-32.4) never exceeded 5 units. Turbidity in the mouth of the Iron River ranged from 20 to 50 for an average of 36 units. For a distance of 22 miles below this point the turbidity of the Brule River ranged from 14 to 18 units. After settling in the Brule Island Dam impoundment (B-1.7), turbidities again fell to 5 units.

This moderate increase in the turbidity and iron content of the Brule River was caused by iron-bearing acid mine drainage from the Homer-Wauseca, Sherwood, Hiawatha #1 and Hiawatha #2 mines discharged into the Iron River. Efforts to reduce the amount of iron and turbidity introduced into the Brule River from these sources should be continued.

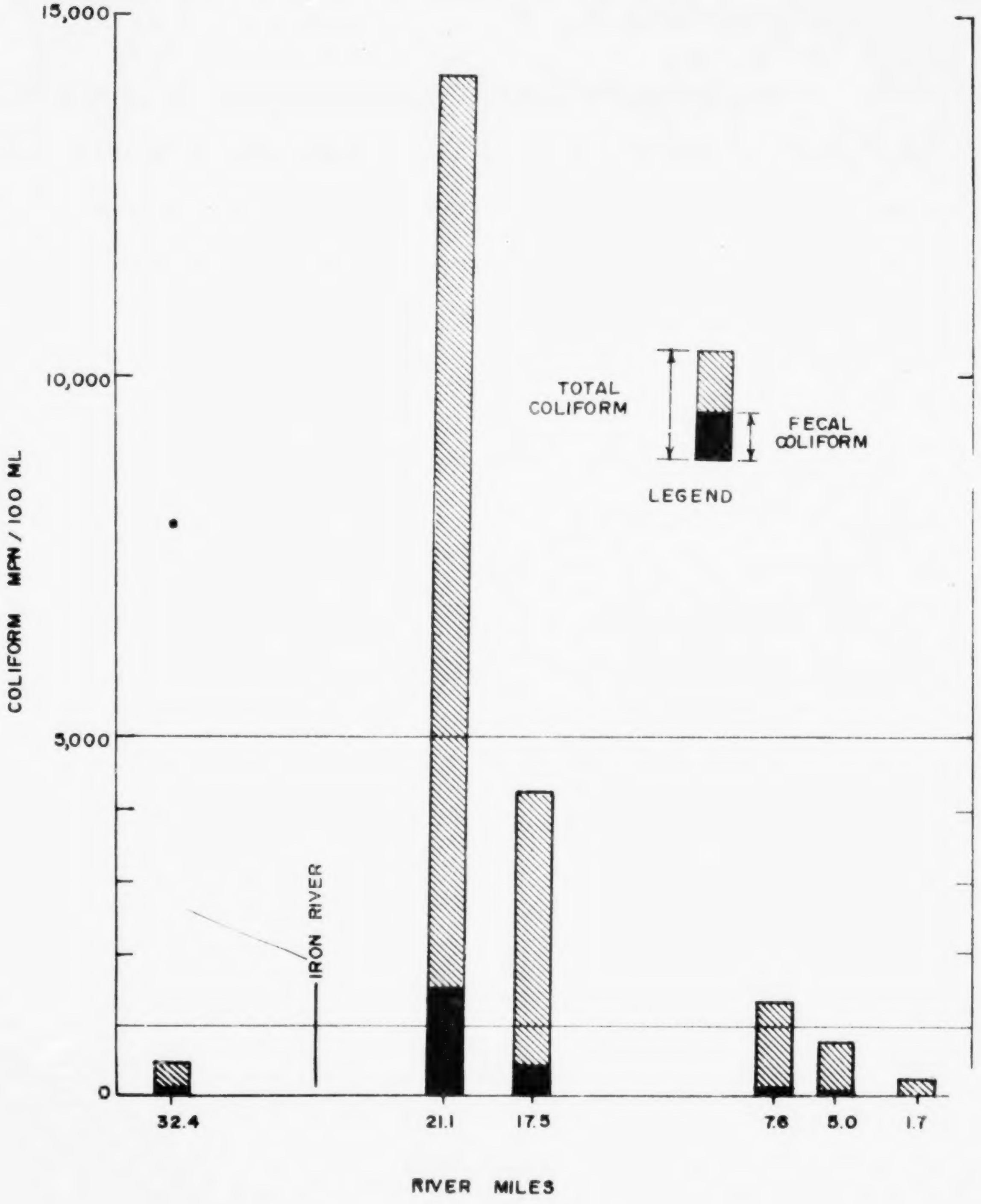
Dissolved Oxygen (D.O.)

The average dissolved oxygen concentration of the Brule River ranged from 8 to 10 mg/1. These high dissolved oxygen values show that neither the organic content of the treated sewage nor the ferrous iron of the mine wastes caused excessive oxygen depletion.

(Figure No. 18 is as follows:)

COLIFORM BACTERIA
BRULE RIVER

FIGURE 18



MR. WEST: Now, if we can set up Figure 18, please?

Coliform Bacteria

The symmetrical mean total coliform and fecal coliform densities in the Brule River during the August 1963 survey are shown on Figure 18.

Six miles above the mouth of the Iron River (B-32.4), the Brule River contained a symmetrical mean density of 395 MPN/100 ml total coliforms and 55 MPN/100 ml fecal coliforms.

Four communities, namely, Iron River, Stambaugh, Caspian and Gaastra, discharge sewage, after varying degrees of treatment, to the Iron River in the reach from five to eight miles above its junction with the Brule River. The Iron River contained 47,500 MPN/100 ml total coliforms and 7,000 MPN/100 ml fecal coliforms at the sampling station 0.6 miles above its junction with the Brule River. At this station, the arithmetic average total and fecal coliform densities amounted to about 90,000 and 10,320 MPN/100 ml respectively. The proportionate amount of this coliform load discharged by each one of these four communities was not determined.

Maximum bacterial pollution in the Brule River was observed at river mile 21.1, some five miles below the mouth of the Iron River, where the symmetrical mean total coliform density increased to 14,200 and the fecal coliform increased to 1,500 MPN/100 ml. At this station the arithmetic average total and fecal coliform densities were 18,230 and 1,920 MPN/100 ml respectively.

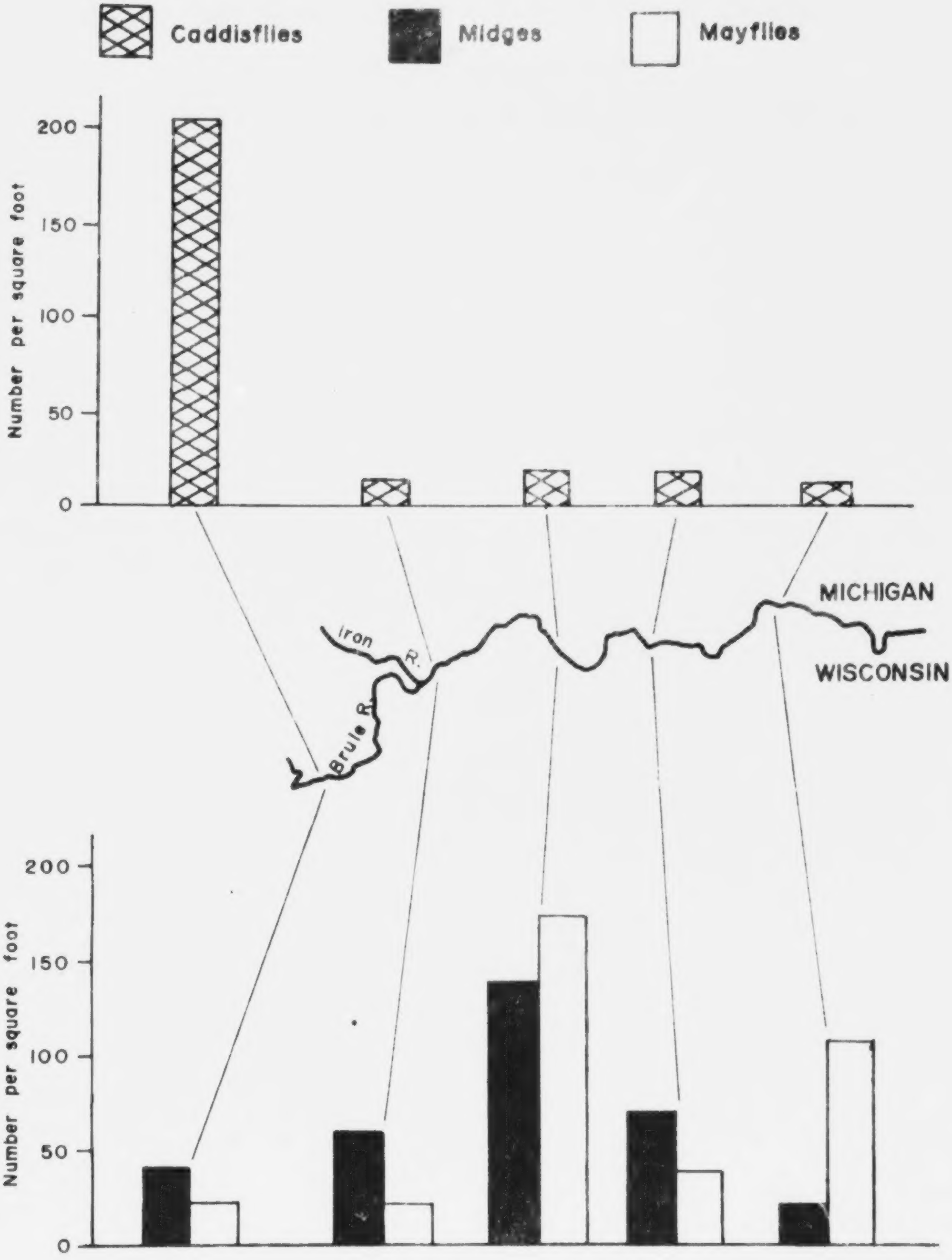
Nine miles below the Iron River (B-17.5), the total coliform density decreased to 4,250 and the fecal coliform density decreased to 430. At this station, and downstream, the coliform densities were below the level considered satisfactory for general recreational use. Twenty-two miles below the junction with Iron River (B-5.0), the total coliform density decreased to 720, which meets the bacterial objective for swimming water quality.

The survey data, illustrated on Figure 18, show that bacterial discharges into the Iron River increased the symmetrical mean coliform densities in the Brule River materially above the 5,000 level considered satisfactory for general recreational purposes, and polluted the interstate waters of the Brule River for a distance of more than five and most probably about eight miles.

A more detailed survey of this local area, including bacteriological analysis of the sewage discharges and purification efficiencies at the treatment plants, should be conducted to establish the proportionate amount of bacterial pollution from each of these four sources and the treatment modifications that may be necessary to safeguard the recreational value of the Brule River.

(Figure No. 19 is as follows:)

Figure 19. Populations of selected bottom organisms—Brule River, August, 1963.



MR. WEST: Now, if we may have the next figure, Figure 19, to discuss the biology of the Brule River.

Bottom samples on the Brule River were collected from the Wisconsin 139-Michigan 189 bridge, above Iron River, to just above McGovern's Creek some 20 miles downstream. Bottom organism populations typically associated with clean water were found above the confluence with the Iron River.

Eight-tenths of a mile below the confluence, the benthic population in the Brule River was severely altered. At this and other downstream stations on the Brule, the population of many sensitive fish food forms typified by the caddisflies, commonly associated with clean water, was drastically reduced. The opposite effect is shown by those organisms that are able to secure their food supply while living in close association with a dense growth of filamentous green algae. The midges and mayflies show a population increase at those sampling sites in which filamentous green algae are abundant. However, these organisms living within a dense algal mass are not readily available as fish food.

The reduction in the fish food supply and the cementing -- by iron deposits -- of gravel areas which will interfere with fish spawning, will serve to reduce the expected fish population within the affected areas.

The effect of the iron deposit on aquatic life in the Iron and Brule Rivers will be evident until the cementing of the rocks and rubble is broken down and natural living spaces for organisms are restored. Further investigations will be needed to determine if the present condition is a result of mine water pumped prior to February 1963, or of current mine activity.

That completes the discussion of the data, and at this time, if I could, Chairman, I would like to call on Kent to illustrate and describe some of the bottom samples.

MR. STEIN: You want Mr. Mackenthun?

MR. WEST: Yes, Mr. Mackenthun.

MR. STEIN: Thank you.

STATEMENT OF K. M. MACKENTHUN, BIOLOGIST, UNITED STATES PUBLIC HEALTH SERVICE

MR. MACKENTHUN: These are preserved samples of some of the bottom deposits collected during the biological portion of the survey.

This sample (indicating) is a portion of a bottom sample taken about one-half mile below the Kimberly-Clark Corporation at Niagara. It is a sample collected from the flowing reach of the river and contains wood fibers and slime bacteria.

MR. STEIN: Mr. Mackenthun, when did you select those samples, or about when?

MR. MACKENTHUN: We collected these during the portion of the biological survey, which was the date Mr. West gave you.

MR. STEIN: All right.

MR. MACKENTHUN: The next sample is a preserved portion of a bottom sample with principally wood chips and certain types of bottom organisms, midges, collected from a reservoir area below Niagara in Sturgeon.

The next samples are samples of wood chips which were taken below the Scott Paper Mill at Marinette, Wisconsin

This jar (indicating) contains a portion of a typical sludge boil, which reacts when gases form within the bottom deposits of wood chips, fibers, and filamented bacteria, and the gases so formed bore the material to the surface, in which it later disperses and resettles to the bottom.

This (indicating) is a portion of a somewhat similar sample containing principally small chips and fibers taken above the Highway 41 bridge between Menominee and Marinette, and these (indicating) are small chips predominantly taken from the bottom of the Menominee River near its mouth.

MR. STEIN: Thank you. Mr. West?

MR. WEST: Thank you, Kent.

FURTHER STATEMENT OF A. W. WEST,
UNITED STATES PUBLIC HEALTH SERVICE

MR. WEST: We would like to summarize now, and this time I will be reading the summary and conclusions directly from the original documents.

SUMMARY AND CONCLUSIONS

The Michigan Water Resources Commission and the Wisconsin Committee on Water Pollution pursue active programs to eliminate pollution in the Menominee and Brule Rivers. Pollution has been reduced by industrial waste control practices and by construction of municipal sewage treatment plants. Compliance with orders by the Wisconsin Committee on Water Pollution should lead to further improvement. The real progress that has been made, however, has not prevented or eliminated pollution of certain reaches of the river.

UPPER MENOMINEE RIVER

Organic pollution discharged to the Upper Menominee River reduced the symmetrical mean dissolved oxygen content of the river below the 3.0 mg/l level considered critical for fish life by the State of Wisconsin. Minimum values observed during August 1963 at each sampling station fell to 2.3 at the Norway power dam eight miles below Niagara and 1.2 mg/1 at Faithorn, Michigan, some 15 miles below Niagara. At each of these two sampling stations all samples contained less than 5 mg/1 and 6 out of 10 of the samples contained less than 3 mg/1.

Solids pollution, including wood chips and fibers, bacterial slimes, and floating scum and septic sludge, degraded the appearance of the river and reduced its esthetic appeal for general recreational use. Solids settled to form sludge deposits which prevent the use of this area for fish spawning and decrease the population of pollution-sensitive fish food organisms for some 22 miles below Niagara, Wisconsin.

The Kimberly-Clark pulp and paper mill in Niagara, Wisconsin, is the principal source of organic and solids pollution.

For a distance of 14 miles below Niagara, Wisconsin, and 9 miles below the mouth of Sewer Creek, the Upper Menominee River contains more than the 5,000 MPN/100 ml total coliform level considered satisfactory for general recreational use. The symmetrical mean density reached 43,500 MPN per 100 ml at the Norway power dam located below Niagara and Norway.

Waste from undetermined sources in Niagara, Wisconsin, effluent from the Niagara, Wisconsin, sewage treatment plant and untreated sewage from Norway, Michigan, are principal sources of bacterial pollution. The proportionate load from each of these sources was not determined.

The Upper Menominee River also shows evidence of degradation by sludge deposits, producing large populations of pollution-tolerant organisms and limiting the development of sensitive bottom forms in the quiet water areas extending from the Iron Mountain-Kingsford sewage treatment outfall to the neck of the impoundment above Upper Quinnesec Dam.

LOWER MENOMINEE RIVER

The Lower Menominee River is degraded for a distance of three miles below the Scott Paper Company, at Marinette, Wisconsin, to its mouth, by wood chips and fibers, slime bacteria, and the elimination of bottom organisms. This pollution adversely affected the physical appearance of the river and reduced its esthetic appeal for general recreational use. The Scott pulp and paper mills in Marinette, Wisconsin, and Menominee, Michigan, are principal sources of pollution above the Marathon Paper Company. Solids from the Marathon Paper Company contribute to pollution at the mouth of the river.

The mean total coliform density of the Lower Menominee River was increased to 8,500 MPN/100 ml, slightly higher than the 5,000 level considered satisfactory for general recreational use. Effluent from the Marinette, Wisconsin, sewage treatment plant is the principal source of bacterial pollution in the Lower Menominee River.

BRULE RIVER

Bacterial pollution in the Iron River, which contains treated sewage from the neighboring communities of Iron River, Stambaugh, Caspian and Gaastra, Michigan, increased the total coliform density of the interstate Brule River waters above the 5,000 MPN/100 ml level considered satisfactory for general recreational use for a distance of more than 5 miles, and most probably 8 miles, below the mouth of the Iron River. The symmetrical mean total coliform density increased from 395 MPN/100 ml above the Iron River to 14,200 MPN/100 ml at the sampling station 5 miles below the mouth of the Iron River. The proportionate amount of this coliform load discharged by each one of the four communities located on the Iron River has not been determined.

For approximately 14 miles, gravel areas on the bottom of the river are cemented together with iron deposits which drastically reduce desirable fish food organisms and interfere with fish spawning. Although much of the damage was done by gross iron pollution which was discontinued in 1963, further investigations will be needed to determine whether or not the present iron mine drainage continues to degrade the river bottom.

Pollution of the Menominee and Brule River is evident. Pollution originating in Michigan and Wisconsin damaged the water quality of the Michigan and Wisconsin waters of these interstate rivers. The pollution, endangering the health and welfare of persons in a State other than in which the pollution originates, is subject to abatement under the Federal Water Pollution Control Act.

That is the report, Mr. Stein.

MR. STEIN: Thank you, Mr. West.

MR. MC DERMOTT: Mr. Chairman, may I ask a question?

MR. STEIN: Yes, certainly.

MR. MC DERMOTT: Mr. West, I notice that in reading this last sentence from your report, you inserted the article "the" before the word "pollution" in the last sentence.

The last sentence reads: "Pollution, endangering the health and welfare of persons in a State other than in which the pollution originates, is subject to abatement under the Federal Water Pollution Control Act."

Did you mean to insert "the"? Do you mean that this particular pollution, about which we have been hearing here this morning while you covered your report, is pollution which does endanger the health and welfare of persons in a State other than in which the pollution originates?

MR. WEST: That is what I mean.

MR. MC DERMOTT: That is what you mean?

MR. WEST: Yes.

MR. MC DERMOTT: And that is what the report means?

MR. WEST: Yes.

MR. MC DERMOTT: Now, may I ask you this:

Has the Secretary of Health, Education, and Welfare, or anyone other than he that you know of in your particular Federal agency, received any definite and firm advice from any source either in Michigan or Wisconsin or elsewhere with respect to illness -- that is, human illness caused to members of the Wisconsin or Michigan public presumably by the pollution about which you have been talking?

MR. WEST: No, I have no record.

MR. MC DERMOTT: No record. Thank you. That is all I wanted to ask about.

MR. STEIN: Are there any further comments or questions?

MR. MUEGGE: I have a few.

MR. WEST: Yes?

MR. MUEGGE: You said that sludgeworms were not used by game fish, or any other fish --

MR. WEST: I'm sorry. I did not hear you.

MR. MUEGGE: I will repeat the question.

In your testimony it was stated that sludgeworms were not consumed by game fish. Does any other species of fish utilize sludgeworms for food?

MR. WEST: I assume that suckers and that type of rough fish would use sludgeworms, but I will refer for a technical answer to this to Mr. Mackenthun, please, Mr. Muegge. He is our expert on biology.

MR. STEIN: Go ahead, Mr. Mackenthun.

MR. MACKENTHUN: Rough fish should be able to utilize sludgeworms as a portion of their food supply under conditions in which rough fish would be able to exist in the area.

MR. MUEGGE: And, should that be the case, then could not the young of the rough fish also serve as the food for game fish?

MR. MACKENTHUN: If game fish were there, yes.

MR. MUEGGE: Is there any other type of organism, aquatic organism life, that also utilizes sludgeworms and some of the debris that has been deposited for food?

MR. MACKENTHUN: I didn't understand the last three words.

MR. MUEGGE: The debris that has been deposited, have any organisms used it as food?

MR. MACKENTHUN: There are other types of organisms that do utilize sludgeworms as a portion of their food supply. These would include certain species of leeches, certain types of organisms similar to midges.

MR. MUEGGE: Might they also be used as food by game fish?

MR. MACKENTHUN: Normally they occur in very low population numbers. If they are used as food by game fish, it would be an extremely small proportion.

MR. MUEGGE: What is the function of a sludgeworm in a stream? Why does it use that as a habitat?

MR. MACKENTHUN: It is living on the sludge that has been deposited on the stream bottom.

MR. MUEGGE: What is its function in that regard? What does it accomplish?

MR. MACKENTHUN: By passing the sludge through its body, the sludgeworm will reduce the B.O.D. of the sludge deposit by a certain percentage. It will further break down the sludge material.

MR. MUEGGE: In other words, they assist in the purification of wastes that are discharged into the stream?

MR. MACKENTHUN: Yes, of sludge.

MR. MUEGGE: Now, since you are the biologist and Mr. West is an engineer, I would like to ask you whether these fecal coliforms are all of human origin?

MR. MACKENTHUN: I would prefer to pass that to Mr. West.

MR. WEST: All right. I will take that one.

The fecal coliforms are all from feces excreted from the intestinal tracts of warmblooded animals, including man, but they are specific.

In other words, it is the washing from a manure pile or the flushing of a toilet bowl which will include these coliforms.

MR. MUEGGE: So will dogs, cats, pets and what not?

MR. WEST: Yes. The fecal droppings from dogs and pets will usually contain fecal coliforms. It is specifically from the intestinal tract from animals and man, which shows something that comes down, that could have occurred in an area where you might have had illness.

MR. MUEGGE: There is one other question.

You indicated, on observations made in Michigan, that some game fish were affected?

MR. WEST: Yes.

MR. MUEGGE: Were those collected and examined in the section of the Lower Menominee?

MR. WEST: I understand they are, and you can ask Mr. Oeming more specifically. I understand they are collected from the polluted section of the Lower Menominee River

MR. MUEGGE: One other thing, just for a matter of clarification.

In one part of the testimony, you said that the solids boiled to the surface. There was no heat involved in that boiling, was there?

MR. WEST: No, there wasn't, Mr. Muegge. It is a descriptive phrase of its coming up and roiling to the surface. After the sludge comes up, it roils to the surface and then spreads out, and then releases some of its gases, and then it goes down again. It is not heat; it is just roiling.

MR. MC DERMOTT: Could I ask just one question?

MR. STEIN: Surely.

MR. MUEGGE: Just one more.

In the testimony, you also referred to growth of bacteria below Niagara. What did you mean by that?

MR. WEST: Normally, below any source of bacterial contamination you have a distinct growth phase. Bacteria grow up to a peak, and then die off downstream under conditions of natural purification.

MR. MUEGGE: Would the heat-producing organisms come under the same situation?

MR. WEST: I understand they also follow a similar pattern, although the growth may not be as precise.

MR. MUEGGE: But under pollution conditions aren't the disease-producing bacteria destroyed rather rapidly?

MR. WEST: I would say they are more rapidly destroyed than the coliform organisms.

But, if I may make a comment, maybe I didn't make this clear. The important thing in this, we have these big growths that die off of coliform. This is where the usual indication of pollution is, but this pattern is followed by the small specific fecal coliforms, which we all know of, which had to come from the intestinal tracts of man and warmblooded animals. It is a good confirmation following known discharges of sewage.

MR. MUEGGE: But your fecal coliforms would react similar to the total coliforms, wouldn't they?

MR. WEST: I understand they do.

MR. MUEGGE: As far as their ability to resist decay and decomposition?

MR. WEST: I understand they do; yes.

MR. MUEGGE: Thank you.

MR. STEIN: Mr. McDermott?

MR. MC DERMOTT: I have just one question, and perhaps either Mr. West or Mr. Mackenthun would like to answer this for me.

As I recall several of your statements, Mr. West, they indicated that in the lower Menominee you had a D.O. of between 3 and 5 milligrams per liter.

MR. WEST: Yes, that is correct.

MR. MC DERMOTT: All right. And, may I ask, what kind of fish life -- what kind of fish are you going to find in waters with that D.O.? What variety and kind?

MR. WEST: In water living -- not propagating, but living in waters 3 to 5 -- let's not say 3, but let's say below 4 -- 4 to 5, or so --

MR. MC DERMOTT: All right.

MR. WEST: You will find a wide variety of the warm-water fish, including the walleyes, and what we have been talking about, but for a well-balanced, continuous propagation of the species, as this dissolved oxygen goes below 5, you start generally reducing the desirable fish population with an increase of the rough fish population.

The three is the critical; the five is desirable.

MR. MC DERMOTT: I see, but below 5 and above 3 is there no propagation whatsoever of the desirable game fish?

MR. WEST: Absolutely not -- wait. No, there is propagation.

MR. MC DERMOTT: There is some?

MR. WEST: But I understand that the propagation of the desirable species decreases as the D.O. goes below 5.

MR. MC DERMOTT: I see. Thank you.

MR. STEIN: Are there any other comments or questions from the conferees?

MR. WISNIEWSKI: I don't think so.

MR. OEMING: Chairman Stein, I have a couple of questions.

MR. STEIN: This was suggested at this side of the table. Would you want to ask the questions first or recess now?

MR. OEMING: It is immaterial to me, Mr. Chairman.

MR. STEIN: If you don't mind, I have received advice here, and this is the first time I am in this beautiful country, but I understand that it might be wise if we are all going to disperse and eat, so that we can all be accommodated, that we use the hours between twelve and two for lunch.

If this is agreeable with you, we will stand recessed until two o'clock. We will try to start promptly. Thank you.

(Whereupon, the conference recessed until 2:00 p.m. of the same day.)

AFTERNOON SESSION

(2:00 p.m.)

MR. STEIN: May we reconvene?

We have received a telegram which says:

"CHAIRMAN, FEDERAL HEARING
MENOMINEE RIVER POLLUTION MEETING
LLOYD GOODFELLOWSHIP HALL
MENOMINEE, MICHIGAN

"Welcome to participants in today's Menominee water hearing. I strongly feel that State control and management by Michigan's Conservation Commission and Michigan's Waterways Commission can adequately and in a positive way effect the controls needed in the abatement of pollution on the Menominee River. Present successes bear this out. Our State groups look for Federal advice and assistance together with local State control. To this future for a clean Menominee River I feel we can all work together.

"Kent T. Lundgren
State Senator
Menominee"

I wonder if Mr. West can come up again? Mr. West?

MR. WEST: Yes, sir.

MR. STEIN: I think the Wisconsin group, fortified by lunch, has gotten a second wind, and they would like to ask some more questions.

Mr. Muegge?

MR. MUEGGE: Mr. West, in my remembrance of your activities in the past, both technical and your own avocations or vocations, you have been very much interested in hunting and fishing.

MR. WEST: That is correct.

MR. MUEGGE: Now, where would you normally go to fish in a stream like the Menominee, or would you go to some of the lakes like we have immediately adjacent?

MR. STEIN: Would you talk a little louder, please?

MR. MUEGGE: I am asking Mr. West what type of water he would prefer, whether he would like the quiescent lakes to go fishing, or the rapids that are located in the Menominee River.

MR. WEST: I fish the quiet waters in a lake where my father owns a cottage. We can conveniently get up there, and we can get walleyes there. I am not a trout fisherman. I haven't fished fast waters myself.

MR. MUEGGE: Do you think that the lakes in

Wisconsin or Michigan are so far removed that they do not offer a sufficient recreational potential for the inhabitants of this immediate area?

MR. WEST: Fishermen will go where the fish are, and it is much nicer if they can go close to home, where it is convenient, if the fish are living there. In the Menominee River, there again I understand that in the past -- this is again hearsay, but conservation folks have told us that these are some of the most beautiful smallmouth bass waters in the world. That is more fun fishing for than walleyes.

MR. MUEGGE: When did this trout fishing occur?

MR. WEST: Trout or walleyes?

MR. MUEGGE: Or walleyes, either.

MR. WEST: I don't know. I mean, this is a statement that was made.

MR. MUEGGE: Prior to the advent of pollution by municipalities or industries, or subsequent thereto?

MR. WEST: I did not investigate this.

MR. MUEGGE: Knowing this area as you feel you do, especially living so close, or, at one time, living so close or visiting so close to the Menominee River, would you consider it fully accessible for recreation?

MR. WEST: It is accessible -- not as accessible as some of the places where they have a road driving right down to the lake, but it is accessible, as trout fishing usually is, because you do the trout stream wading. It is accessible to those who like to fish these waters for the smallmouth bass or trout.

MR. MUEGGE: Quite a few roads cross the area that is most affected by pollution. Isn't that right?

MR. WEST: Yes. There is the Highway 8 bridge. You can cross it there and get in, and we took samples between Niagara and the Highway 8 bridge.

You have to go on the Michigan side of the river and drive right into a -- I don't know if you call it a parking area, but there are parking places, and people can get in and wade the streams and fish if they want.

There is limited access -- the type of thing you get on a stream, for instance, versus a big lake.

MR. MUEGGE: Did you ever observe the Menominee River in the past prior to your present studies?

MR. WEST: No, I have not.

MR. MUEGGE: Could I ask Mr. Mackenthun one question?

MR. STEIN: Yes.

Mr. Mackenthun, will you come up and join Mr. West? Mr. West, don't leave. Why don't you both stay up there?

MR. MUEGGE: Mr. Mackenthun, have you been familiar with the conditions of the Menominee River over a period of years?

MR. MACKENTHUN: Yes, sir.

MR. MUEGGE: You have made several surveys of this stream on behalf of the Wisconsin Committee on Water Pollution?

MR. MACKENTHUN: I have made two prior surveys, to the best of my knowledge.

MR. MUEGGE: Was there an improvement or a change in the condition of the stream between the two investigations?

MR. MACKENTHUN: No appreciable change in the biology of the stream; no.

MR. MUEGGE: There was no appreciable change?

MR. MACKENTHUN: Between the investigations. Right.

MR. MUEGGE: Between the two investigations you made on behalf of the Committee on Water Pollution is what I am after.

MR. MACKENTHUN: One of those, as I recall, was in about 1953. I have not looked at a copy of that particular report for a number of years, and do not have a personal copy.

As I recall, changes, if any, had been very minor. I do not recall of any specific changes in the biology of the river between those investigations.

MR. MUEGGE: All right. Thank you.

This is a general comment: I wish to indicate that we appreciate the fact that when the Public Health Service looks to technical advice in these fields of water pollution, they draw upon Wisconsin's resources.

(Laughter.)

Of course, if we could have retained these persons, we could have done more too in water pollution. Both Mr. West and Mr. Mackenthun had been former employees of the Committee on Water Pollution and the State Board of Health.

MR. STEIN: Thank you, Mr. Muegge. I take it we won't have to qualify our experts.

(Laughter.)

MR. STEIN: Are there any further questions? Mr. Oeming?

MR. OEMING: Mr. Chairman, I have a couple of questions for Mr. West.

I believe this morning, in summarizing the report, he extracted the following quotation from Page 8:

> "There are times, however, when lake currents reverse and carry Menominee River water toward the north and to both the Menominee and the Marinette intakes."

In reading the rest of the report and in his presentation, I believe he omitted a quotation on Page 36, which has considerable bearing on the first statement, and if I may now read this:

> "Bacterial pollution of the Lower Menominee River is reduced by dilution and natural purification as these waters flow into Green Bay. Water quality, as measured by the coliform tests, was satisfactory at the bathing beaches and the water works intakes in Green Bay during the survey."

My question to Mr. West is, so far as his studies are concerned, this would indicate, would it not, that there is no endangerment of recreational uses or to the water supplies in Green Bay?

MR. WEST: During the period of our survey. Yes, sir.

MR. OEMING: My second question concerns a statement that Mr. West made this morning to the effect that 1.1 parts per million B.O.D. found above Kimberly-Clark was indicative of the average of the B.O.D. of clean water.

Does this mean to you that this is the level above which you would say it is indicative of unclean water?

MR. WEST: No, sir. I was trying to use that as an example that low B.O.D.'s of around 1 or maybe 2 are found in clean waters.

What I was really trying to say was that the above water was clean, as evidenced by this one part per million of B.O.D.

MR. OEMING: In other words, you could have B.O.D.'s of 2 to 2-½ perhaps and still have clean water, could you not?

MR. WEST: Yes, sir.

MR. OEMING: What is the significance of B.O.D. in and of itself?

MR. WEST: As of itself, it is descriptive of the water. It is coordinated with a measurement or a knowledge of organic wastes going into the stream.

This shows what is in the stream and what is likely to use up the dissolved oxygen in the stream, and then, of course, I think in our report we went from B.O.D. as a descriptive phrase or description of the stream and showed what it did. Then we covered our discussion of the dissolved oxygen, and that is really the significant part of the stream survey that shows what damages have occurred.

So, it is B.O.D. that causes the reduction of dissolved oxygen, which we set up on our posters.

MR. OEMING: In other words, sir, you might safely say that if you found a B.O.D. of 10, if the dissolved oxygen were not lowered appreciably, you wouldn't be concerned about the B.O.D.? This could happen?

MR. WEST: It could happen, and I wouldn't under those circumstances.

MR. OEMING: That is all I have, Mr. Chairman.

MR. STEIN: Mr. Pierce?

MR. PIERCE: I have a general question which I should like to ask of you, Mr. Stein.

I wonder, would it be possible for the State agencies to obtain from the survey staff and the technical people who analyzed the data for this report a portion or all of the raw data, so that their technical people might in turn evaluate it?

MR. STEIN: Certainly. Now, I know the answer to this may sound corny, but at least in this field, where a public agency is doing a public business in a public manner, we don't have any data, raw or otherwise, which is not subject to full inspection and not available to you.

Now, if the technical staff has any reason where mechanically this is not available or can't be available now, I would like to know about it. If we don't, our general policy prevails, and this will be available to the State agencies.

MR. WEST: I can describe that.

We collected raw data on the streams. Coming into the office, we worked up rough work sheets of analyses. We have never put these into tables. We just picked off the summaries from our work sheets and used those to develop our charts.

We would be delighted to have Thermofax copies of these work sheets which bring our data up as far as we did, and give them to Michigan and Wisconsin.

MR. PIERCE: This would be very helpful, and we would appreciate this very much.

MR. STEIN: Mr. Ronk?

MR. RONK: I have nothing to say.

MR. STEIN: Mr. Schneider?

MR. SCHNEIDER: I have nothing, Mr. Stein.

MR. STEIN: Well, I am just a little confused.

Mr. Mackenthun, I would like to ask a general question. This may come as a surprise, because I have known Mr. Mackenthun too, and I have never asked him a question like this; but in light of the questioning this morning, if the sludgeworms provide a basis for food for the rough fish, and the game fish can eat the rough fish, why are we having this big fuss from the biologists about pollution? Why can't we just have sludgeworms in all our streams and still have very good game fish? Just let the rough fish live on the sludgeworms, and the game fish eat the rough fish, and we can dispense with this problem.

MR. MACKENTHUN: There are a number of answers to that particular question, one of which concerns the spawning activity of game fish.

In the first place, sludge would be available to support a large sludgeworm population, as a food supply for the sludgeworms.

If it is available, it is covering up the natural stream bottom, thereby preventing natural areas for spawning activities of the game fish.

Also, the rough fish, which may at times utilize certain numbers of sludgeworms as a portion of their food supply, would not be likely to filter through a large mass of fibers or chips or material of the nature such as is displayed in these jars to avail themselves of the population.

MR. STEIN: Thank you.

Are there any further questions?

(No response.)

MR. STEIN: If not, thank you very much, Mr. Mackenthun and Mr. West.

Mr. Schneider, do you have any more Federal representatives?

MR. SCHNEIDER: Yes, Mr. Chairman. I have four representatives from other Federal agencies, who have indicated they desire to make statements today.

I would like first to call upon Dr. Paul H. Eschmeyer of the Department of the Interior, who will present a statement from that Department.

Dr. Eschmeyer.

STATEMENT OF DR. PAUL H. ESCHMEYER, UNITED STATES BUREAU OF COMMERCIAL FISHERIES, UNITED STATES DEPARTMENT OF THE INTERIOR

DR. ESCHMEYER: This statement is being read for Harold C. Jordahl, Jr., who was unable to be here today. Mr. Jordahl is Regional Coordinator for the United States Department of the Interior in the States of Michigan, Wisconsin, Minnesota, Iowa and Illinois.

Secretary of the Interior Stuart Udall, in a statement before a subcommittee of the House Committee on Government Operations, earlier this year expressed the Department of the Interior's interest in maintenance of clean water as follows:

> "... the focus of Interior effort is directed to the maintenance of adequate national water supplies and adequate water quality for whatever uses man may wish to make of this valuable resource. The Interior approach emphasizes the coordination and interrelation between uses and the effect of these uses on management and quality of the total water supply system.

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> "Maintenance of water quality involves not only the quality levels for human consumption, but also quality levels for consumption by other animal and plant life, for development of other natural resources, and for industrial processes. These quality considerations are interrelated. They can be understood and controlled best from the point of view of water as a resource, rather than from the point of view of a particular quality need."

The Department of the Interior has a rich background of experience and knowledge in this area and is equipped with highly qualified technical manpower. All bureaus and offices of the Department have an interest in water resources. In the Menominee River area the Bureaus of Outdoor Recreation, Commercial Fisheries, Sport Fisheries and Wildlife, and Mines and the Geological Survey and National Park Service have a direct interest. Representatives of several of these bureaus are here today.

The Menominee River Basin has a rich variety of natural resources with which the Department has a concern. The area is located within the Upper Great Lakes region, which with its forests, lakes and rivers and its summertime air-conditioned environment offers a great playground for the vast urban areas in the upper Midwest.

The nine upper Midwest States which make up mid-America contain 50 million people. Much of this nine-State region is flat or gently rolling prairie, plain and field, and has a relative scarcity of water and topographic resources for recreation purposes, but many fine highways provide ready access to all points of the compass.

Mid-Americans making plans for vacations and outdoor recreation look to the Ozarks in the Southwest, to the Smoky Mountains in the Southeast, or to this Great Lakes region to the north.

The highway pattern in Mid-America indicates that the Menominee River Basin is within easy reach of these 50 million people. The States along the Mississippi River are developing the Great River Road Parkway along the river. An interstate highway will link the metropolitan Minneapolis-St. Paul area with Lake Superior. Michigan has completed a major north-south highway and is planning an extensive system of scenic shoreline drives around the Great Lakes. Residents of Detroit and Toledo and Columbus, Ohio, now find several hours cut from their travel time to this northern region. Wisconsin, likewise, is completing an interstate network which will tie together the great Chicago metropolitan area with Milwaukee and points north, and the State is now considering a system of north-south routes to provide improved and faster access to the northern Wiscons upper Michigan area.

The improved new highways and those which are planned will provide the arteries along which the people in Mid-America will flow to this northern region. A great opportunity exists here to achieve both the social goal of providing our citizens with facilities for recreation and the economic goal of stimulating the economy.

The Menominee River Basin makes up an important part of this Great Lakes region recreational complex. However, clean water in the basin is essential if the area is to make its contribution to the social goal and to share in the economic proceeds associated with a healthy recreation-tourist industry. It is important to keep in mind that this area is characterized as an Area Redevelopment Area. The economy is sliding; underemployment and unemployment are widespread and populations are declining. To establish a healthy, balanced economy it will be necessary to build on the natural resource base -- the minerals and the forests -- and, perhaps most importantly, the water resources.

Populations of deer, ducks, grouse, upland game, and other forms of wildlife are important assets in the basin, as are trout and warm-water fish. Boating and canoeing opportunities exist on the many lakes and streams in the basin. Hiking, swimming, camping and driving for pleasure are other important forms of outdoor recreation possible in this area. And in one way or another these activities are dependent upon a well-managed water resource

The Outdoor Recreation Resources Review Commission in their voluminous studies highlighted the importance of water to outdoor recreation as follows:

> "Water is a focal point of outdoor recreation. Most people seeking outdoor recreation want water -- to sit by, to swim and to fish in, to ski across, to dive under, and to run their boats over. Swimming is now one of the most popular outdoor activities and is likely to be the most popular of all by the turn of the century. Boating and fishing are among the top ten activities Camping, picnicking and hiking, also high on the list, are more attractive near water sites. About 90 percent of all Americans participated in some form of outdoor recreation in 1960 -- a total of 4.4 billion occasions. By 1976 the total will be 6.9 billion, and by the year 2000 it will be 12.4 billion -- a threefold increase by the turn of the century."

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To protect, enhance and to assist in developing the important recreation resources in the Menominee Basin, are the National Park Service, the Bureau of Sport Fisheries and Wildlife and the Bureau of Outdoor Recreation. The Congress recently vested the latter bureau with broad responsibilities for meeting the recreation needs of the American people.

Special mention should be made of the Bureau of Sport Fisheries and Wildlife responsibilities in this field. This bureau is a signatory to a Memorandum of Understanding with the Department of Health, Education, and Welfare concerning water pollution control. This agreement was developed in recognition of common interests in the field of water pollution and to make possible a more effective program of interagency cooperation. It is in accordance with the Fish and Wildlife Coordination Act of 1956, which authorizes the Secretary of the Interior, through the Fish and Wildlife Service and the Bureau of Mines, to make such investigations as he deems necessary to determine the effect of domestic sewage, mine, petroleum, and industrial wastes, erosion silt, and other polluting substances on wildlife, and to make reports to the Congress concerning such investigations and of recommendations for alleviating dangerous and undesirable effects of such pollution. These investigations shall include:

1) The determination of standards of water quality for the maintenance of wildlife;

2) the study of methods of abating and preventing pollution; and

3) the collation and distribution of data on the progress and results of such investigations for the use of Federal, State, municipal and private agencies, individual organizations or enterprises.

The 1956 Act also authorizes a broad range of activity by the Bureau of Commercial Fisheries. The national fish policy established by the 1956 Act places high on the list of goals the responsibility for the economic betterment of the commercial fishing industry in all its phases -- production, processing and distribution. Pollution is one of the factors that limits the production of food fish and threatens future fish production.

The commercial fishermen of America have played a unique part in this country's economy since its founding. Fisheries are still of major importance to many sections of the country. Employment, direct and indirect, is furnished to 500,000 citizens. Our fisheries supply over five billion pounds of fish each year, about half of which is used for

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human food. The fish catch, when processed, is worth over a billion dollars annually at the retail level.

Although there is no commercial fishing in the Menominee River Basin, these waters drain into Green Bay and Lake Michigan. The waters of the bay are being increasingly subject to the effects of pollution from its tributary streams. Not only are recreational amenities being seriously threatened; the potential of these waters to support a healthy commercial fishery are being damaged.

The Bureau of Commercial Fisheries is presently concerned with the suitability of the waters of the Great Lakes, and particularly the waters of major bays, for fish and fish food organisms. However, it is difficult to localize the areas that are affected severely by a pollutant. Very often the effects of effluents and heavily polluted rivers are expressed as biological demonstrations miles from the origin. We must, therefore, include much of Green Bay and the adjacent waters of Lake Michigan in measuring the effects of pollutants contributed by a river like the Menominee.

The Great Lakes and their connecting waters comprise the largest single expanse of fresh water in the world. Perhaps the great size of these lakes has led us to believe that, like the oceans, they are little affected by the activities of man. Some of the earlier limnological surveys of the lakes did indeed suggest that, despite pollution of many of the tributaries and shore waters, the open waters of the lakes were remarkably free from chemical and sewage pollution. Data from more recent studies, on the other hand, show that the open waters are being affected by pollution.

Fish are the property of no man until caught. In life they are the concern of the people and can be conserved and managed by governmental authority -- local, State, Federal, or international. Because they are hidden beneath the surface of the water, special and complicated techniques are needed to find out how they can be managed so as to yield maximum sustained production. Sound management requires an understanding of the nature of living resources and the environment they inhabit. The stocks of fish which support our fisheries are self-renewing. They can endure forever, and, therefore, are more valuable by far than the annual yield would suggest This is true only if we manage them wisely, and we can do this only if we understand their habits and their interrelationships with each other and with their surroundings.

Where the environment becomes changed or damaged by pollution, the fish population and fish food organisms have to adjust themselves to altered conditions or vanish. This produces fluctuations of abundance, changes in species composition, changes in growth rate, and many other modifications, most of which do not benefit mankind.

Green Bay has been influenced for many years by the waste products of lumbering and paper manufacture. Some of the earliest studies of paper mill pollution were done there. As a result, significant contributions have been made to the fund of knowledge needed to alleviate objectionable pollution by the paper industry. All of the problems have not been solved. Some local areas, such as the Menominee River, continue to develop serious situations which result in tainting of fish flesh and in major alteration of the natural environment. Some of these alterations persist long after the oxygen demand of waste sulfite liquors has been satisfied. Finely ground cellulose covers much of the deeper bottom of Green Bay and its degradability is slow indeed. The traditional and most useful bottom organisms are influenced greatly by these accumulations. Recovery from the effects of such blankets of flocculent, unstable bottom materials is very slow.

Commercial fishing in the vicinity of Menominee River is often handicapped seriously by the accumulations of wood products on nets. These products move with the currents activated by storms. Their contamination of the nets is serious enough, at times of heavy blows, to stop the fishery entirely.

Green Bay has been a major producer of fish for many years. Production in Michigan waters of the bay averaged 5.4 million pounds annually during 1944-1950. Production of the species of major value has declined rather markedly in Michigan waters since 1956, mainly because of the extreme paucity of lake herring and whitefish and a decline in stocks of walleyes and smelt. Lake herring production dropped from 3.8 million pounds in 1954 to 45,000 pounds in 1960. Whitefish fell from more than 600,000 pounds in 1953 to 1,000 pounds in 1959. Walleye production declined from 906,000 pounds in 1955 to 101,000 pounds in 1960 and smelt fell from 5.7 million pounds in 1956 to 2 million pounds in 1960. The total production would have been much lower had it not been for the yield of alewives, which reached 1.6 million pounds in 1960. This change in production cannot be attributed exclusively or even mainly to water pollution. Sea lamprey predation, failure of year classes, and the invasion of the alewife have had major effects on the production pattern. However, historically, there has been a general deterioration in the fishery for the more desirable species progressively from the southern tip of the bay toward the north. A gradual, almost unnoticed, retreat has occurred of highly prized species such as lake trout, whitefish, lake herring, and walleye, from the affected areas. These fish were replaced by increasing populations of carp, smelt, alewives, and yellow perch.

We can expect these changes to continue and to spread unless corrective action is undertaken promptly. Even the smallest contributor to the deterioration of our waters becomes vital and important especially when its contribution combines with countless others to present a formidable problem of national concern.

Usable water in the Menominee Basin is essential to the area's mineral industry. It is important that the mineral industry have access to water in quantities and qualities sufficient to meet their basic needs.

The iron ore mining operations included in the basin are in the districts of the Menominee Iron Range. These are the Iron River-Crystal Falls district in Iron County, Michigan; the Menominee and Felch district in Dickinson County, Michigan; and the Florence district in Florence County, Wisconsin. Today only the Iron River-Crystal Falls and Felch districts are active.

There are five active mining operations on the Menominee Range -- four in the Iron River-Crystal Falls district and one in the Felch district. Several mines in the Iron River-Crystal Falls district have closed, but are still processing and shipping ores from stockpiles.

The future of the iron ore industry and its water requirements in the basin is uncertain. Direct shipp of ores from underground mines faces increasing competition from high-grade taconites and foreign imports. One company is presently beneficiating low-grade ores from this region. The future of the iron ore industry here probably lies in upgrading of the low-grade ores which lie near the surface.

Assistant Secretary of the Interior Carver, in a statement on July 8, 1963, stated the following relative to the role of the Bureau of Mines in the pollution control field:

> "Mineral-industry water interests initially conflict with all other major water interests. To ameliorate such conflicts the Bureau of Mines of this Department encourages the mineral industries to practice water conservation, including water-quality control. In this way we promote attainment of an equitable use balance within the total national demand for water. Water withdrawn from natural supplies must be used over and over where feasible. Waste water effluents must not be

"allowed to impair significantly the quality of our water supplies.

"Under the provisions of the Bureau of Mines Organic Act, it is both the province and the duty of the Secretary of the Interior to conduct economic inquiries and scientific and technologic investigations among the mineral industries with the aim of improving health conditions, increasing safety and efficiency, and preventing economic waste.***
Close contact with current industrial practices is maintained through activities that include: 1) conduct of cooperative studies with State and other governmental agencies and with industry; 2) participation in the committee work of technical societies; and 3) informal exchanges of information between Bureau and industrial specialists in appropriate fields.

"This Department presently is conducting a canvass to determine water use in the mineral industries in 1962. It will cover metal and non-metal mines and mills, coal preparation plants, petroleum production, and natural gas processing plants. Informatin collected will include some

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> "water-quality information, including treatment methods for new water, recycled water, and water before its disposal. The canvass is being undertaken to provide valid water-use data from which to project future mineral-industry water needs and to provide basic information needed by governmental and other groups for sound water-development planning. This data will also be useful for determining present or incipient trouble spots, thus permitting initiation of research by the mineral industry and, where appropriate, by Government agencies to develop early solutions to water conservation and use problems."

The other major bureau of the Department, the Geological Survey, can assist you in the studies and investigations which will follow in this basin. Over many years they have compiled, analyzed and interpreted data on surface and ground waters in this and other basins in the region. Moreover, data on ground water quality are available. A reconnaissance survey of the ground water resources of Menominee County is currently under way. Offices are presently located in both Michigan and Wisconsin; a water quality research center at Columbus, Ohio, may also be able to help.

Mr. Carver in the statement previously noted stressed the essential element of cooperation as follows:

> "In the early days of water resources conservation and development there was little need for coordination among the various Federal agencies involved. The field was so sparsely occupied, water problems -- especially water quality problems -- were so relatively less urgent than they are now, that coordination was not then a major consideration. Today, and in the years ahead, close and effective coordination is essential. This Department and other Federal agencies must pool their resources in order to accomplish our goal of acceptable levels of water quality for our natural resources and our economic needs."

On behalf of the Department of the Interior and in line with this statement, we assure you that we will make every effort to assist on this study and to achieve a goal of acceptable water quality in the Menominee River Basin.

MR. STEIN: Thank you, Dr. Eschmeyer, for a very comprehensive statement.

Are there any questions?

MR. WISNIEWSKI: Dr. Eschmeyer, you gave a figure of 5 billion pounds of annual production by commercial fisheries.

Is that the total annual United States production for salt and fresh water, or is that fresh water production?

DR. ESCHMEYER: This is the complete production.

MR. WISNIEWSKI: Complete salt and fresh water production?

DR. ESCHMEYER: That's right.

MR. WISNIEWSKI: That amounts to about 30 pounds per capita on the basis of the 180 million population.

That is all I have.

MR. STEIN: Are there any more questions or comments?

MR. SCHNEIDER: I would like to ask Dr. Eschmeyer one question.

The Department of the Interior, I think, is considering a designation of wild rivers.

DR. ESCHMEYER: I beg your pardon?

MR. SCHNEIDER: Of wild rivers. Do you have any plans for this Menominee River Basin in that respect?

DR. ESCHMEYER: I am sorry to say I can't answer that question.

This is a prepared statement which I was reading, and it is something which I don't have knowledge of.

MR. SCHNEIDER: Thank you.

MR. STEIN: Thank you very much, and give my personal regards to Mr. Jordahl.

MR. SCHNEIDER: Mr. Chairman, the Chicago District of the Corps of Engineers of the United States Army has indicated they would also like to present a statement, and I would like to introduce Colonel John C. Mattina.

Colonel Mattina.

STATEMENT OF JOHN C. MATTINA, COLONEL,
DISTRICT ENGINEER, UNITED STATES ARMY
ENGINEER DISTRICT, CHICAGO

COLONEL MATTINA: Mr. Stein, ladies and gentlemen:

I sincerely appreciate this opportunity to represent the Corps of Engineers at this meeting and to discuss with you the responsibility of the Corps on matters affecting water pollution. I propose to develop the relationship of Corps activities to water pollution in two general areas, regulatory and operational. I will also identify and discuss pollution problems incident to Corps activities using examples obtained generally from our experiences in the Chicago District or the North Central Division, of which the Chicago District is a unit.

The Corps of Engineers is responsible for the administration of laws for the protection of navigable waters and the construction, maintenance and operation of improvements authorized by Congress for navigation and flood control, including multiple uses embracing power, water supply, and low river flow augmentation. The principal laws having a relationship to water pollution in which the Corps is involved are the River and Harbor Act approved 3 March

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1899, and to a lesser extent the River and Harbor Act approved 3 March 1905. Section 10 of the 1899 Act provides for the regulation of construction, excavation, and filling in navigable waters and Section 13 of the same Act makes unlawful the deposit of "refuse matter of any kind or description whatever other than that flowing from streets and sewers and passing therefrom in a liquid state..." in navigable waters or their tributaries. There is another law. Section 4 of the 1905 Act charges the Secretary of the Army with regulation of dumping of "dredgings, earth, garbage, and refuse materials of every kind..." when necessary in the interest of navigation.

The Oil Pollution Act of 1924 is not applicable to waters in the Great Lakes area, since it concerns only waters in which "the tide ebbs and flows." However, oil discharged from vessels has been held to be refuse matter, and, therefore, its discharge into navigable waters of the United States is a violation of Section 13 of the 1899 Act This is our basic Act. (La Merced, Circuit Court of Appeals, Washington, 84 Fed. 2nd 444).

REGULATORY FUNCTIONS

The Corps of Engineers' activities in connection with the administration of the laws enacted by Congress for the preservation and protection of navigable waterways of the United States cover the establishment of navigation and bridge regulations, harbor lines, anchorage areas, danger zones, seaplane restricted areas, dumping grounds, and fish stake limits; the issuance of permits and approval of bridge plans; and the investigation of obstructions, wrecks, oil pollution and illegal deposits.

Section 13 of the River and Harbor Act of 3 March 1899 is the law available to the Corps of Engineers for oil pollution and illegal deposit matters. Section 10 of this Act pertains to the creation of obstructions by construction or dredging in navigable waterways. These sections contain the authority vested in the Corps of Engineers in regard to pollution.

Since the primary purpose of these statutes is to protect navigation from obstruction and injury, enforcement has been concentrated on prevention of pollution, including oil, that will impede or injure navigation.

The most serious problem in oil pollution enforcement rests in the difficulty of securing the necessary evidence to warrant prosecution. The large expanses of open water, the isolation of vessels navigating thereon, and the devious and hidden methods of discharging oil make it frequently impossible to ascertain the vessels and persons responsible. Inspections of probable sources of pollution from industrial establishments are made frequently, particularly in areas where violations are common, with a view to keeping the navigable waterways free from oil pollution and obstructive and injurious deposits. In addition, an education program is carried on to inform the general public, oil companies, and other industrial establishments of the Federal law relating to oil pollution and the discharge of injurious deposits into navigable waterways. This is accomplished through the issuance of press releases and notices to mariners citing extracts of the law.

A major source of oil pollution, not curable under existing laws administered by the Corps of Engineers, is the untreated effluent from municipal and industrial sewers. The extent of municipal sewer systems and of the connections thereto render identification of the oil sources a practical impossibility.

One district in the North Central Division has investigated 26 instances of oil and refuse pollution since 1957. Of these 26 cases, only two remain unresolved. These cases have been referred to the United States Department of Justice for prosecution. They involve the spillage of 1,400,000 gallons of fuel oil and 3,000,000 gallons of soybean oil respectively. These oils were subsequently washed by the rains into the Minnesota River and a tributary thereto forming an oil slick over 125 miles in length on the Minnesota and Mississippi Rivers and causing extensive damage to ducks and other wildlife. Thirteen cases involved minor inadvertent spillages in which the violators were warned. In the remaining eleven cases the offenders removed the source of pollution upon request of the Corps of Engineers.

The only case in the Chicago District involving illegal deposits, which was prosecuted through the courts to a successful conclusion, is that involving the depositing of flue dust in the Calumet River, Illinois, by three major steel companies

These three steel companies in 1951 and prior years dredged their waste materials deposited in the Calumet River upon demand by the Corps of Engineers. However, in 1953 they refused to remove additional deposits which had formed in the river channel when requested by the Corps of Engineers. After prolonged attempts at negotiation and continued refusal by the steel companies, suit was initiated by the Government in the U. S. District Court in 1954 to compel the steel companies to remove the illegal deposits under Sections 13 and 10 of the River and Harbor Act of 3 March 1899. The District Court on 24 June 1957 rendered a decree favorable to the Government.

The steel companies appealed the U. S. District Court's decision to the U. S. Court of Appeals for the Seventh Circuit on 7 November 1957. The Court on 22 January 1959 rendered a decision in favor of the steel companies dealing only with the applicability of the 3 March 1899 Act to the case and reversed the decree of the District Court.

The U. S. Department of Justice petitioned the U. S. Supreme Court in April 1959 for a writ of certiorari. The case was argued in January 1960, and on 16 May 1960 the Court rendered a decision reversing the U. S. Court of Appeals on the question of law and remanded the case to it for proceedings and sufficiency of evidence in conformity with the opinion.

Defendants again petitioned the U. S. Supreme Court for a rehearing, which was denied on 6 December 1960.

After oral arguments in the Court of Appeals, a decision was rendered affirming the decree as to the prohibitory injunctions, but reversing it as to mandatory injunctions and remanding the case to the District Court for a new trial on 17 February 1961.

Negotiations between the defendants and the District Engineer were undertaken in 1962 and 1963. A tentative agreement was reached by which the three steel companies would pay $620,000 to the United States for removal of existing deposits of flue dust and an annual amount of $25,000 for removal of future deposits. The agreement was approved by the Department of Justice and the Secretary of the Army, and a final decree terminating the litigation was issued by the District Court on 2 August 1963. Permits were issued by the Department of the Army to the steel companies on 1 August 1963 permitting the disposal of flue dust in the Calumet River and requiring payment of an annual amount of $25,000 for its removal. This payment is to be reduced as the companies decrease their solids contribution to navigable waters.

The above case is cited to point out the extended period of litigation involved, almost nine years, and the difficulty in interpreting the existing law.

Many industrial processes result in illegal deposits in navigable waterways to such an extent as to impede navigation. An example is the deposition in Calumet and Indiana Harbors of solids from steel mills aggregating over 6 million yards between 1949 and 1963. These deposits were removed by the steel mills upon request of the Corps of Engineers.

Efforts in the Detroit area to obtain removal of illegal deposits have been successful to a limited degree in connection with papermill, cement manufacturing and

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chemical plant wastes, where such wastes were readily identifiable with the industry involved However, where many industries discharge industrial wastes into the same watercourse, the commingling of any solids involved renders identification of offenders and fixing of their quantitative responsibility extremely complex and probably precludes successful prosecution to abate the discharge or to remove the solid deposits. The liquid industrial wastes, although they may be pollutants, are not violations of the River and Harbor Act of 1899 if they reach the water through sewers.

With respect to the Menominee River, the Federal channel for which the Corps has responsibility extends approximately 2.5 miles from a point .38 miles lakeward from the east end of the Government piers to a point approximately 600 feet downstream from the U. S. Highway 41 bridge. Some shoaling attributed to the Marathon Corporation paper mill has been found in the river adjacent to their plant, but to date this has not contributed to the shoaling in the Federal channel. Accretion in the Federal channel to date again is considered to accrue from natural sources and usually occurs during the spring runoff from the entire watershed. Consequently, in this area we have not had to invoke the provisions of the River and Harbor Act of 1899.

Pollution in the Fox River in Wisconsin, with which many of you are familiar, between Green Bay and Lake Winnebago is well known to all concerned. However, accretion in the Federal channels from any source -- natural or industrial wastes -- has been negligible upstream from De Pere. No dredging in this area has been accomplished during the past ten years. There has been a modest quantity of shoal material removed from the Federal channel between De Pere and Green Bay. The channel in this reach lies in substantially wide and shallow waters.

On 2[illegible] August 1963 the Kimberly-Clark Corporation was advised by letter that the sludge bank in little Butte des Morts adjacent to their Lake View Mill was in violation of Section 13 of the River and Harbor Act of 3 March 1899, and was requested to initiate corrective action. On 23 September 1963, in reply, the company advised that a new fiber recovery "saveall" would be installed early in 1964 to prevent further discharge of solids into the river and that the size of the present sludge bank in the river would be reduced to insure unimpeded continuance of navigation. A newspaper article dated 30 October 1963 described the removal of the sludge bank by dredging. The material dredged was to be placed in special dry-out areas on an experimental basis, which, if successful, could be instrumental in improving treatment of paper mill wastes.

In summation, therefore, the Corps of Engineers, in the administration of the laws, attempts first of all to eliminate illegal deposits by encouraging industries to improve their treatment of wastes, or use confined shore disposal. If this is unsuccessful, or technologically infeasible, the industry is requested to remove, or pay for removal, of its illegal deposits. In the event of refusal to remove the deposits, prosecution is recommended if supporting evidence is obtainable.

There has been in the last few years a rapid expansion of the recreational use of the nation's waterways. Newcomers to this recreational pursuit do not grasp or know of the importance of maintaining or improving water quality. Many of these boat owners or operators are totally unaware of the many laws and regulations pertaining to pollution and the dumping of refuse matter of any kind into navigable waterways and their tributaries.

Since a substantial majority of the boat owners or operators are law-abiding citizens and will cooperate in any endeavor to preserve and/or improve the quality of water in our waterways, a grass-roots educational program will be launched next spring in the North Central Division as a step toward the elimination of pollution and refuse from recreation boats in our navigable waters.

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In cooperation with other Federal and State pollution agencies, the Engineer Districts in the North Central Division will develop a plan for dissemination of all Federal and State laws and regulations dealing with pollution and refuse matters to small craft owners and operators. Public notices, brochure-type handouts, signs, news releases and television and radio copy are some of the media that will be used to advise, as well as warn, potential offenders. Handouts, signs, etc., will contain suggestions as to methods to be used for disposal of refuse other than overboard.

In its administration of Section 10 of the River and Harbor Act of 3 March 1899, covering the issuance of permits for construction of wharves, piers, dolphins, booms, weirs, breakwaters, bulkheads, jetties, or other structures in navigable waters of the United States, the sole consideration of the Corps of Engineers is whether the proposed structures themselves constitute an unreasonable obstruction to navigation. However, coordination is effected with fish and wildlife agencies whenever, upon consideration of the work proposed under a permit application, it is indicated there may be a detrimental effect on fish and wildlife if the work were accomplished.

Permits involving the construction of outfall sewers from industrial establishments are thoroughly investigated. In cases where it is determined there may be a deposition of solids in navigable waters that may cause an obstruction to navigation, a special condition is included in the permit making the applicant responsible for removal of the shoal material upon request of the Corps of Engineers.

CONSTRUCTION AND DREDGING

Construction activities include those for construction or repair of piers, breakwaters and revetments on Lake Michigan, and locks, dams, levees and floodwalls. These activities do not in themselves have any measurable effect on water quality and all of the contracts require the contractors to comply with all local and State ordinances and laws governing health and sanitation in the conduct of their work. Dredging activities, public and private, do create pollution problems. However, these problems include turbidity created by the dredging process, both at the point of dredging and also at the disposal location, and the possible transportation and dispersion of polluted bottom materials to areas of better water quality. The 1910 Act protects the water supplies of the cities of Cook County, Illinois, and Lake County, Indiana, that use Lake Michigan water from dredged pollutants, but does not lessen the total general pollution of the lake waters, nor protect cities on other sections of the lake shores from possible pollution transferred by open water disposal of dredged material. Although the native bed materials of the lakes and rivers are not in themselves polluted, contributions of sewage and industrial wastes from shore sources become incorporated with and pollute the shoals.

The Corps of Engineers has initiated improvements in dredging methods, providing for direct pump out of Corps' hopper dredges and, for example, has constructed three diked disposal areas in the Toledo and Detroit areas. Those improvements were undertaken primarily to achieve lesser costs for maintenance dredging, but they also gave recognition to the desirability of confining polluted dredgings to preserve the quality of offshore waters.

Since most forms of pollution reach navigable waters via sewers in liquid state and do not cause any obstruction to navigation, the Corps of Engineers does not have a clear basis for attempting to eliminate them.

OPERATION OF COMPLETED PROJECTS

The operation of locks is solely for the passage of navigation and has no effect on water quality. Dams associated with navigation projects, for example, on the Mississippi and Illinois Rivers, and Fox River, Wisconsin, are operated primarily to maintain stable navigation pools and have no capacity for flood water storage and only minor capacity for low-flow augmentation during the winter season when there is no navigation. The six headwater reservoirs on the Upper Mississippi were constructed prior to the navigation locks and dams for the purpose of augmenting low Mississippi River flows as an aid to navigation. These reservoirs are now regulated for recreation and limited flood control as well as low-flow augmentation.

PLANNING AND DESIGN

The Corps has recognized for some time that water quality must be considered much earlier and more completely than in the past if maximum benefits are to be derived from water resource projects. Studies by the Senate Select Committee on National Water Resources showed an increasing number of situations where low-flow conditions were becoming critical, which led to the adoption of the Water Pollution Control Act Amendment of 1961 (P.L. 87-88). Section 2 of the P.L. 87-88 provides authority for consideration, during the survey and planning stages of reservoir projects, of the inclusion of storage for stream flow regulation for water quality control. At this time the planning of all reservoirs includes consideration of storage requirements for pollution abatement purposes.

In addition to projects programmed or in the planning stage, existing reservoirs and even reservoirs that will be created by dams presently under construction are being re-examined to determine the feasibility of incorporating water quality and pollution abatement measures in the plans of regulation.

Comprehensive river basin studies, currently being undertaken by the Corps of Engineers in cooperation with other Federal agencies, will include the basins of the Upper Mississippi and its tributaries. The Fox River was included initially. However, because of conflicting local usage desires the study has been delayed pending the completion by the State of Wisconsin of its own study on the Fox River. Reservoir systems conceived in the course of comprehensive planning will provide storage to permit maintenance of water quality through low-flow regulation, as well as for water supply, flood control, recreation, and related water uses

Releases from existing reservoirs do not have adverse water quality effects on downstream areas. Impoundments in reservoirs do not have the depth to create thermal stratification and, therefore, releases are not depleted of oxygen and the water temperatures are relatively constant. To the contrary, releases made from the Upper Mississippi reservoirs, for example (including headwater reservoirs and navigation pools), for navigation purposes also provide an increase in the quality of water, since low flows are augmented and the oxygen content increased by cascading the water over spillways and flumes

Although there are no data indicating adverse effects due to water releases from reservoirs in North Central Division, Coralville Reservoir in Iowa has been selected as a typical medium-size reservoir suitable for water quality investigations. Similar studies are planned for other reservoirs.

RESEARCH

In recent years interest in Great Lakes research has increased markedly and greater emphasis is being placed on such efforts by the U. S. Lake Survey District. During 1962, an expanded research program was formulated for the Lake Survey District with the objective of improving knowledge of Great Lakes hydrologic factors and of such lake phenomena as waves, seiches, surges, currents, ice cover, and shore processes.

In several instances, the observations and studies are made in cooperation with other agencies. During the past ten years, the Lake Survey, in cooperation with the United States Weather Bureau, has maintained precipitation gauges on islands in northern Lake Michigan. Better information is needed regarding that important part of the Lakes' water supply, which comes to the Lakes by direct precipitation on their surfaces.

The Corps has designed and constructed an instrument tower which was placed in Lake Michigan in July of this year at an offshore location near Muskegon, where the water is 50 feet deep. The Lake Survey District and the Public Health Service have placed instruments on it to measure motions of the water; the Weather Bureau and the University of Michigan will place instruments on it to measure atmospheric conditions above the water. Certain of the data will be coordinated with lake current observations made by buoy stations in the lake by the Public Health Service; other data are for improving the knowledge regarding evaporation from the lake surface.

The results of such research are expected to yield information that is useful in connection with studies of water supply, water quality, and water utilization

The foregoing presents broadly Corps of Engineers activities, particularly those which are considered to have a relationship to water quality and pollution abatement. The importance of preserving or improving the quality of our water resources is unquestioned. Within the framework of the laws and regulations governing our activities we shall continue to take such actions as are feasible and possible to improve or protect water quality. We stand ready to cooperate wholeheartedly with other Federal and State and local agencies dealing with this problem.

Thank you very much.

MR. STEIN: Thank you, Colonel Mattina.

Are there any questions?

MR. WISNIEWSKI: I have a question.

Colonel Mattina, does the Corps of Engineers maintain the channels in navigable streams?

COLONEL MATTINA: This was either done by Corps of Engineers' dredges or under contracts.

MR. WISNIEWSKI: Do you know how the Corps of Engineers dredges are equipped for the disposal of sewage garbage?

COLONEL MATTINA: Usually, our practice has been to put them in scows and dump them in offshore areas, in deep water.

MR. WISNIEWSKI: You dump them from the dredges

COLONEL MATTINA: No. I beg your pardon. I was thinking of the dredges that we have. We usually have chemical toilets.

MR. WISNIEWSKI: Thank you.

MR. MC DERMOTT: Colonel, I understand from what you have said here that when you find a violator or an alleged violator of Section 407 of 33 U.S.C.A. -- that is the statute I think you referred to as having been enacted in 1899, the March 3rd statute, the same one?

COLONEL MATTINA: Yes.

MR. MC DERMOTT: You refer the case of the violation or the alleged violation to the appropriate United States Attorney; and, am I right in thinking that in the case of your office, there would be two United States Attorneys with whom you would have contact in these matters. One would be the United States Attorney in Chicago and the other would be the United States Attorney for the Eastern District of Wisconsin in Milwaukee. Is that so?

COLONEL MATTINA: Yes.

MR. MC DERMOTT: How long have you been in charge, sir, of the work you are presently doing?

COLONEL MATTINA: Since the 15th of June of this year.

MR. MC DERMOTT: Of this year. Do you know from your experience with the job and the experience of your predecessor -- let's take 1954 as a departure date -- how many cases of alleged violation of this Section 407 have been referred to the two United States Attorneys whom I have named, by your office, if you know?

COLONEL MATTINA: Chicago -- let me go back to one I do know.

MR. MC DERMOTT: Yes.

COLONEL MATTINA: There was just one case. This was a trial case to ascertain whether this law was applicable.

MR. MC DERMOTT: That was the one commenced in 1954 in the District Court in Chicago and up to the Supreme Court of the United States.

COLONEL MATTINA: Yes. Before that, as far as the Chicago District was concerned, we were doing this on a voluntary basis by the organization with whom we had contact.

MR. MC DERMOTT: I am curious to know this: It relates back to an experience I had recently when I listened to a good many angry citizens over on the Mississippi, in Minnesota, complaining about that oil spillage, or leakage, or whatever it was, that caused a number of duck deaths.

There, I gathered from information supplied me, that that matter had been referred to the United States Attorney in Minneapolis. I believe his name was Miles Lord, and Mr. Lord had declined prosecution, I gather.

Now, I am looking at Section 413 of this same Title 33, U.S.C.A., and I note that it says:

> "The Department of Justice shall conduct the legal proceedings necessary to enforce the provisions of Sections" --

and then it lists them, and among them is Section 407, the one you have reference to. It says here:

> "It shall be the duty of the United States Attorneys to vigorously prosecute all offenders against the same, whenever requested to do so by the Secretary of the Army or by any of the officials hereinafter designated."

Do you view that statute, Colonel, as meaning that if you request the United States Attorney to prosecute one of these matters, he has no option in the matter, nor discretion, and he must proceed to prosecute, if you ask him to?

COLONEL MATTINA: You have me on a legal question. I don't know.

MR. MC DERMOTT: You don't know the answer?

COLONEL MATTINA: I don't know whether it is mandatory for him to proceed. I would assume he would proceed if he had what he considered the information to prosecute the case with.

However, you have got me on a case that I am not that thoroughly familiar with, as I am with the flue dust case in Chicago.

MR. MC DERMOTT: All right Thank you. No further questions.

MR. STEIN: Are there any further questions?

MR. OEMING: No questions.

MR. STEIN: No questions here.

I think I will pass by my comments on the Mississippi situation. Let me not prolong this. I hope we won't get into a colloquy.

Let me go off the record here.

(Discussion off the record.)

MR. STEIN: All right.

COLONEL MATTINA: Thank you very much.

MR. STEIN: Thank you very much.

May we go on, Mr. Schneider?

MR. SCHNEIDER: We have a representative here from the United States Forest Service, from the Nicolet

National Forest, Mr. K. P. Butterfield, the Forest Supervisor.

Mr. Butterfield.

STATEMENT OF KENNETH P. BUTTERFIELD,
FOREST SUPERVISOR OF THE NICOLET
NATIONAL FOREST, UNITED STATES
FOREST SERVICE

MR. BUTTERFIELD: Mr. Chairman, ladies and gentlemen:

My name is Kenneth P. Butterfield and I represent the United States Forest Service as Forest Supervisor of the Nicolet National Forest.

My statement today will concern the upper headwater areas of the Iron and Paint Rivers in Michigan and of the Popple, Pine and Brule Rivers in Wisconsin. All of these rivers are tributaries of the Menominee River and have their headwaters either in the Ottawa National Forest in Michigan or the Nicolet National Forest in Wisconsin. I would like to point out, however, that the headwaters area actually covers only a portion of each national forest.

History of this national forest headwaters area began in the 1600's with the advent of early explorers,

K. P. Butterfield

missionaries and trappers. Principal exploration and development of iron ore deposits occurred during the period of 1840 to 1880. Exploration of the virgin pine stands occurred from 1870 to 1900, followed by wholesale cutting of the virgin northern hardwood stands from 1900 to 1930. Land settlement began about 1878 with farming reaching its peak by 1920. However, climatic conditions were not conducive to good crop yields. Most farms failed and have since ceased to exist. After logging, many fires occurred in the cut-over areas, killing valuable young growth and destroying the seed sources for future timber crops. The result was that large areas became entirely barren or inadequately stocked. During the 1920's, local governments and residents of both States began to support recommendations for the establishment of national forest purchase units. The Ottawa National Forest was proclaimed by the President of the United States on January 27, 1931, followed by a similar proclamation on March 2, 1933, for the Nicolet National Forest.

Public Law 86-517 specifically directs that the national forest system be managed for multiple use and sustained yield of all surface resources. Multiple use is already the guiding principle of management of many public and private lands. Timber, water, wildlife habitat, forage, crops and recreation may be joint products of the same farms, ranches, or forest lands.

Competition for use of land and water increases the need for more intensive use and the need for putting the available land and water to more than one use. The American people cannot afford to use these two resources for a single purpose if that purpose can also be achieved in combination with other uses. Millions of acres of land will be required for urban expansion, super highways, new airports, transmission lines, pipelines, hydroelectric dams and flood control reservoirs.

Improvement of cropland, pastures, and forest management will benefit watershed conditions. The overall continuing objective should be the management of crop, range and forest land for the protection and development of small watersheds, thereby minimizing flood damages and sediment yields, and improving the quality and quantity of water. In the management of the national forests, consideration is given to aspects of water quantity and quality through soil stabilization and resource management practices.

I would like to point out what we in the Forest Service are doing in the headwater areas to control pollution through proper management of national forest resources and lands.

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Maintenance of the vigor of the vegetative masses tends to give a good dispersion of the annual rainfall. Most of the precipitation filters down into and through the soil and later appears as runoff in our streams. Surface erosion and bank cutting is then of a minor nature as the water level of the lakes and streams will only mildly fluctuate.

Management of the timber resource includes proper road location and construction, correct cutting practices, and planting of open, brushy, and burned areas. To date many thousands of acres of land once considered lost to good timber production are now producing high quality stands of timber. Timber management accomplishes four things:

(1) Nonproductive areas are placed into production;

(2) Soil cover is achieved and maintained;

(3) Forest hydrologic conditions are improved; and

(4) Surface runoff and erosion is retarded.

Fire protection has been thorough and effective, but our fire prevention problem has been complicated by the terrific influx of tourists, campers, fishermen, travelers, and others scattered throughout the national forests. The more people, the more the potential for disaster-type fires.

To help us combat this potential danger, the Forest Service cooperates with the States of Michigan and Wisconsin in protecting this area. Fire protection not only has improved the timber stands in quality, but there has been a decided improvement in the overall hydrologic conditions of the area.

Increased and concentrated recreation use creates problems that formerly did not exist. Land clearings for recreation sites, roads, and trails create overland runoff problems. The heavy concentration of people tramples the soil, compacts it, and upsets the hydrologic condition of the area. New roads and trails increase and concentrate water flows. Recreation sites on lakes and streams concentrate use on lake shore and stream banks. Stable banks suddenly are subjected to more use in one year than they received in the previous century. These problems must be planned for, coped with, and corrected.

Fishing on many lakes and streams constitutes one of the major recreational uses of these two forests. Stream bank erosion in soils of high erosion hazard constitutes a major impact on the fishing resource. This is additionally complicated by the intermingled character of ownership on the streams. The Forest Service, in cooperation with the Department of Conservation of both the States of Michigan and Wisconsin, has made progress on improvement projects for some streams. However, reduction of stream sedimentation and stabilization of stream channels are necessities of major importance. Our maintenance of good land cover and fire protection have improved the hydrologic conditions of most of the headwaters area. This, coupled with problem spot corrections, will vastly improve our streams and remove silt pollution from the upper headwaters.

Within this area of the national forests, the basic transportation network, together with a secondary road system, is a limiting factor in the overall development and utilization of forest resources. Improvement of the present transportation network is needed for the purpose of moving products and people in and out of this area on a year-around basis.

Coupled with an improved transportation system is the hazard of increased pollution and erosion. Roadside and ditch erosion, off-road erosion, chemical pollution of streams from blacktopped and oiled road surfaces, herbicide control of brush, poor drainage, flooded stretches, disposal areas of clearing debris, unstabilized borrow pits, and eroding road cuts or fills are examples of such hazards. New roads also mean additional private access roads, building construction, power lines, etc., and the possibility of additional erosion and pollution, unless adequate control measures are taken.

The Forest Service makes a concentrated effort to reduce these sources of erosion and pollution whenever new or improvement road projects cross or use national forest land. We require that all disturbed and open areas be stabilized and planted to grass or trees, that drainage concentrations be slowed and spread out to minimize erosion and silt pollution, that natural drainage routes be kept open and free-flowing and that disposal of excess material be on locations where they will not contaminate streams or bodies of water.

The Ottawa and Nicolet National Forests are vitally concerned with the importance of these headwater watersheds to the industrial and residential needs of this area. These watersheds are the headwaters of five major tributaries of the Menominee River, comprising a total acreage of 325,000 acres within the exterior boundaries of the two national forests.

The Forest Service has made and will continue to make sure that national forest land will have suitable ground cover. protection from fire, use of correct timber management practices, careful road building, and controlled recreation use on critical areas. Fulfillment of these practices will materially add to the improvement of forest hydrologic conditions. The Forest Service aim is to manage and protect the watersheds within the national forests and in this way serve and enhance the resources and opportunities of this area. Flood control prevention measures are provided to protect people, property, and downstream productive lands. Improved hydrologic conditions provide for maximum water infiltration, thereby assuring subsurface flow and maintenance of water levels of streams and lakes. Surface and ground waters are of adequate quantity and of a quality suitable for domestic, municipal, agricultural, and industrial use.

I would like to close by saying that the Forest Service has a vital interest in the well-being of this area and stands ready to participate and cooperate in water quality and quantity studies that will aid in the solution of the problems.

Thank you.

MR. STEIN: Thank you, Mr. Butterfield.

Are there any comments or questions? Just one moment, Mr. Butterfield.

MR. OEMING: Mr. Butterfield, does the Forest Service permit cutting of timber out of the forests and release in pulp mills in this area?

MR. BUTTERFIELD: Yes, it does.

MR. OEMING: This is on a lease basis, or an agreement basis of some kind, is it?

MR. BUTTERFIELD: This is under what we call a timber sale contract, in which we sell the timber at a price per cord, and then the companies or the people who buy the timber do the logging.

All we do is supervise it, and, of course, measure the quantity.

MR. OEMING: Are there any conditions in these agreements with respect to water usage or the ultimate result of processing the pulp, and so forth?

MR. BUTTERFIELD: No, there is nothing about the ultimate processing.

Of course, we have clauses in these contracts concerning the erosion problems and building roads to get the timber out, but we don't do anything about it at all after it gets off the land.

MR. OEMING: You do not have anything to do with what happens to the waste or the loss of wood in the pulp mills, and so on, in the stream?

MR. BUTTERFIELD: No.

MR. STEIN: Thank you.

Mr. Oeming, you know there was once a bill introduced in Congress about fifteen to twenty years ago which would have prohibited the Government from buying paper from any paper mill which polluted a stream.

That bill didn't seem to get anywhere, and I think if the Congress couldn't put it through, I don't think the Department of Agriculture can.

(Laughter.)

MR. STEIN: Mr. Schneider?

MR. SCHNEIDER: We have with us today a representative of the Federal Power Commission from the Chicago office, a civil engineer, Mr. John J. Abramson.

STATEMENT OF JOHN J. ABRAMSON, CIVIL ENGINEER, CHICAGO REGIONAL OFFICE OF THE FEDERAL POWER COMMISSION

MR. ABRAMSON: Mr. Chairman, gentlemen: I am pleased to be here in Menominee on behalf of the Chicago Regional Office of the Federal Power Commission to participate in this conference on water quality problems in the Menominee River Basin. I say on behalf of the Chicago Regional Office of the Federal Power Commission for the reason that the comments I am about to make represent the views of that office, and are not necessarily those of our five-man Commission.

We have a keen interest in this Basin for the reason that it contains 19 operating hydroelectric projects having a total installed capacity of approximately 105,000 kilowatts. Of these 19 projects, eight, having a total installed capacity of about 61,000 kilowatts, are under Federal Power Commission license; and license applications have been submitted for two additional projects having a total capacity of 15,800 kilowatts. It is expected that applications for the remaining nine projects will come in gradually, and will all have been submitted within the next one and a half to two years.

We have not been aware of any pollution problems in the Menominee River Basin possibly because all of our presently licensed projects are upstream from the paper mill at Niagara, and, of course, above the two mills located here in the vicinity of Menominee. On other rivers where there are paper mills upstream from our hydroelectric projects, we are often made aware of their presence by the build-up of sulfite wastes in the powerhouse forebays. Although unsightly, this material does no particular harm insofar as power operations are concerned. However, it has been alleged in some instances that certain paper mill effluents do attack turbine runners, causing a rapid deterioration of the blades. This point has to date, and to our knowledge, not been proven. Nevertheless, studies of this problem are continuing.

Insofar as the lower reaches of the Menominee River are concerned, it is believed the hydroelectric projects likely have a beneficial effect in diluting any industrial wastes that may be present. Starting immediately upstream from Niagara, seven of our eight presently licensed projects rise approximately 400 feet in a near-continuous ladder of dams. The Big Quinnesec, Kingsford, and Twin Falls projects rise in that order on the Menominee, to be followed by the Michigamme Falls, Peavy Falls, Hemlock Falls, and Way Dam projects on the Michigamme River. In the Michigamme Reservoir, behind Way Dam, there is storage space for approximately 120,000 acre-feet of water which is released annually in the interest of power generation at the downstream power plants. This storage is generally filled in the April and May high runoff months and is then doled out gradually over the succeeding ten-month period of lower flows to keep a near constant level of system power generation. Storage at the downstream power plants is merely sufficient to provide for daily -- possibly weekly in some instances -- peaking operations.

These seven projects, and the very small (100 kw) licensed Lower Paint project on the Paint River, are all owned by the Wisconsin-Michigan Power Company. Collectively, they represent more than half the company's total generating capacity. This company also owns the Chalk Hill and White Rapids projects which are located some thirty miles or more downstream from Niagara. These are the two projects for which license applications have recently been submitted and which are currently under study. It is of interest to note that the company uses the 1,200 acre-feet of pondage at White Rapids to level out the peaked river flow from the Chalk Hill project, which is located immediately upstream.

J. J. Abramson

A number of you gentlemen present may have received copies of the applications for license for the Chalk Hill and White Rapids projects and have been asked to comment on them. As many of you know, the Commission has long made it a practice to notify governors and State and local agencies of applications for preliminary permits and licenses for hydroelectric projects and has given them an opportunity to submit comments. In addition, notices of filings of applications are published in local newspapers and in the Federal Register. Furthermore, before acting on an application, the Commission requests the Secretaries of the Army, Agriculture and the Interior to comment on the project as it affects their interests, and, if other Federal departments or agencies are involved, they likewise are requested to submit their views.

These actions are taken because the Federal Power Act requires the Commission to consult with others, and to investigate upon its own initiative as necessary, in order to assure that licensed projects will be built and operated in a manner which -- in the words of the Act -- "... will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development,

" and for *other beneficial public uses*, including recreational purposes..." (Emphasis supplied.)

The Commission has taken the view that these "other beneficial public uses" include the alleviation of stream pollution and the improvement of water quality. Arrangements have recently been made to obtain the comments of the Department of Health, Education, and Welfare on the water quality and public health aspects of proposed projects. The comments of this agency, as of those previously mentioned, are helpful to the Commission in determining whether to issue a license and in establishing appropriate conditions to licenses issued for both new and constructed projects. If the present operation of an unlicensed project -- that is, a project which requires a license, but for which the owner has not yet applied and received one -- is not making a maximum contribution to alleviating the pollution problem, in some cases the Commission may be able to assist in remedying the situation if the project is finally licensed by imposing license conditions which will require operations to be consistent with a pollution control program.

The best time, of course, to provide for a project's optimum use for all beneficial purposes is when it is in the planning stage, i.e., before it is constructed.

For a constructed project probably the most opportune time is when a license is being sought for it. However, even for a licensed project, the door is not closed to considering means of improving its operations. On the Flambeau River, for example, one of our licensees is making a study of the effectiveness of admitting air into the turbine draft tubes as a means of increasing the amount of dissolved oxygen in the water released through their power plant.

With respect to the Menominee River Basin, the Commission staff is going to be most interested in receiving your prompt comments in regard to water quality problems, and other matters with which your agency may be concerned, in connection with the license applications which we currently are and will be processing. However, please be assured that we have a specific and continuing interest in the possibilities for improving water quality by operational means at projects both licensed and in the process of licensing. Our door will always be open for your suggestions.

MR. STEIN: Thank you, Mr. Abramson.

Are there any comments or questions?

(No response.)

MR. STEIN: We surely appreciate your coming.

We have heard from the Federal agencies representing the Department of Health, Education, and Welfare, Department of the Interior, Corps of Engineers, and Department of Agriculture, which, to us, are generally considered the traditional four in water problems.

Your Federal Power Commission is recently, at least, to our gratification, taking an increased interest in water problems.

I have one question here: Are any of these projects, these dams, particularly the small ones among these 50-year license dams, at the point where their licenses are running out?

MR. ABRAMSON: Yes. Offhand, the Way Dam up the Michigamme River is up for license in 1970. There is another one which I don't recall offhand.

MR. STEIN: I think this is just not applicable here.

During the 1920's, there were quite a number of licenses given out for these dams by the Federal Power Commission, and this is a matter of history as far as I am concerned, but I understand there was a lot of opposition by the conservationists to the establishment of these dams. As in most of these matters, a compromise was reached.

These dams were licensed for a period of 50 years, and with the coming of the 1970's, these 50 years are up, although when the people obtained the licenses I expect they thought the 50 years was forever. These dam sites are being reviewed by the Federal Power Commission.

A lot of these dam sites are very small ones, or relatively small ones, I should say, particularly in the light of the development of hydro power and the regulation of rivers now.

The Federal Power Commission is going to look at all these dam sites before they re-issue the licenses, to determine the best use which can be made of that site, and particularly its use for water quality control.

There may be a chance to have new leases for water control measures, or even in some cases it might be desirable to abandon the dam sites completely and let the river run.

You have a complete freedom now, as these licenses are coming up, to look at these sites again within the light of improving the water quality in the rivers.

MR. MUEGGE: May I ask one question?

MR. STEIN: Yes, Mr. Muegge.

MR. MUEGGE: Are there any fish passageways required at any of these dams?

MR. ABRAMSON: Some of them we do, but, of course, wildlife is just a small facet. We are mainly interested in the water as far as power is concerned.

MR. MUEGGE: Do you know whether any of the dams in the Menominee Basin have a fish passageway?

MR. ABRAMSON: I don't know offhand.

MR. MUEGGE: Thank you.

MR. STEIN: This concludes the Federal presentation, doesn't it?

MR. SCHNEIDER: Yes, it does.

MR. STEIN: Next we have the State of Wisconsin. I suggest we take about a five-minute break, and we will begin promptly.

(Whereupon a recess was had.)

MR. STEIN: May we reconvene?

At this point we would like to call on the State of Wisconsin for its statement.

Mr. Muegge?

STATEMENT OF O. J. MUEGGE, STATE SANITARY ENGINEER, WISCONSIN BOARD OF HEALTH, COMMITTEE ON WATER POLLUTION

MR. MUEGGE: My personal comments will be brief since statements as to details are to be covered by other conferees and by representatives of the State Board of Health.

I wish to point out that the Board and Committee are most desirous of eliminating pollution from all sources, such as waste waters from municipalities, industries, mines, vessels and farms. All may supply nutrients, suspended solids or toxic wastes. We welcome and solicit constructive and advisory help from any Federal, State or local agency. However, we deplore the duplication of effort in the field of investigation and control, since we feel that monies spent in such duplication could be better applied to the investigation and control of pollution within the State.

Although the State has been very active in pollution control, has issued many orders, such orders have been issued from the standpoint of maintaining an essentially uniform degree of pollution control throughout the State, giving consideration to availability of treatment processes for control of wastes and economics that may be involved insofar as municipalities, industries and the State as a whole are concerned. On occasion we have had to act as referees on water pollution problems and pass judgment thereon, usually favoring the parties that were in favor of clean waters, or by a compromise solution that was at least partially helpful to both.

A new law has been passed by the legislature to control siltation from all sources. It is hoped that monies may also be appropriated for research in water pollution control to speed up effectiveness of action and maintain closer contact with sources of pollution and earlier knowledge of effectiveness of controls that have been initiated.

In closing this very brief statement, I hope that Mr. Schneider will return the Brule River of Wisconsin to Wisconsin. The Brule, that was so famous as a trout stream, is located up in Douglas County and discharges directly into Lake Superior.

MR. SCHNEIDER: Thank you, Mr. Muegge. That would come from being a sanitary engineer instead of a historian.

MR. MUEGGE: Mr. McDermott will now follow with a statement on the procedure.

STATEMENT OF JAMES H. MC DERMOTT,
ASSISTANT ATTORNEY GENERAL, STATE
OF WISCONSIN

MR. MC DERMOTT: Mr. Chairman, my fellow conferees and ladies and gentlemen:

I'd like to comment briefly on the water pollution laws of Wisconsin -- laws making it possible for the State and all its subordinate units of government -- municipalities and quasi-municipal corporations -- to take effective action against water pollution.

By way of background for my comments on such law and its enforcement, let me say something about the two State agencies which play the chief roles in the water pollution field in Wisconsin. They are the State Board of Health and the Committee on Water Pollution. Under Chapter 144 of our statutes, both these agencies have broad grants of power authorizing the actions they take, jointly or independently, in the water pollution field. By statute, the State Board of Health has "general supervision throughout the state of the health and life of its citizens." Sec. 144.03 specifically gives it "general supervision and control over the waters of the state, drainage, water supply, water systems, sewage and refuse disposal, and the sanitary conditions of streets, alleys, outhouses and cesspools, insofar as their sanitary and physical condition affects health or comfort." As you can see, the Legislature didn't miss much in that grant of power. By Sec. 144.53 (1) it gave the Committee on Water Pollution the power, "to exercise general supervision over the administration and enforcement of all laws relating to the pollution of the surface waters of the state." This, too, is a grant of power covering a very large area. And in exercising these grants of power, the Board of Health and Committee, as you may know, issue orders -- sometimes jointly, sometimes independently. These orders are issued to individuals at times, but more often to corporations, municipal or private. Generally speaking, these orders are aimed at obtaining a disposal of sewage and refuse consistent with the best interests of public health, safety, comfort and welfare. If they are violated, there are statutes in Chapter 144 designed to punish the violation, or to prevent its continuance. In the case of Board of Health orders, violations may be enjoined as a public nuisance, and may also be punished by a penalty or forfeiture of not less than $10 or more than $5,000 for each day the failure to comply with such order continues. In the case of an order of the

Committee, penalty for violation is a forfeiture of not less than $10 nor more than $100, except where the violation, ladies and gentlemen, is wilful. Then the maximum forfeiture goes up to $250 per day, each day of continued violation a separate offense. Orders of the Committee may also be enforced by injunction. These are statutes, you will observe, with teeth in them -- that is, they provide for effective penalties when and if such penalties are sought in court, when it is necessary to go after them, and they also make injunction available to prevent continued violation of Board and Committee orders. It is the job of the Attorney General of Wisconsin to seek those penalties, when it becomes necessary to do so.

The practice under Chapter 144 has been for the State Board of Health acting separately or jointly with the Committee on Water Pollution to issue orders requiring submission of plans for installation of treatment plants and for construction pursuant to such plans where the pollution problem is one primarily related to public health. If, on the other hand, the problem does not involve public health but is confined essentially to industrial pollution, impairing the usefulness of the waters in question for recreational and fishing purposes, the Committee on Water Pollution acts separately. If both industrial pollution and public health are involved, the practice has been in the past and continues to be to issue joint orders under Sec. 144.565.

In seeking enforcement of State Board of Health orders or Committee on Water Pollution orders or joint orders of both agencies, the Attorney General of Wisconsin has made it a practice to ask for the maximum penalty provided for a violation of any given order, and also to ask for a mandatory injunction to compel compliance with such order. When most of us think of an injunction I believe we think in terms of a so-called prohibitory injunction, which prohibits the performance of some act. A mandatory injunction, however, orders the performance of an act, the performance of which will bring about some results good and desirable in the eyes of the law. In the cases I am talking about, the act or acts ordered by mandatory injunction secured from one of our courts is compliance with an order of the State Board of Health, Committee on Water Pollution, or a joint order of both agencies.

At this juncture let me say that by statute the Committee on Water Pollution has the power, "to issue general orders, and adopt rules and regulations applicable throughout the state for the installation, use and operation of practicable and available systems, methods and means for controlling the pollution of the surface waters of the state through industrial wastes, refuse and other wastes." It also has the power, "to issue special orders directing particular owners to secure such operating results toward the control of pollution of the surface waters as the Committee may prescribe, within a specified time."

The statute goes on to say: "If such results are not secured in the specified time, the Committee may direct the owner to take certain steps or to use or adopt designated systems, devices and methods for handling industrial wastes, refuse and other wastes within a specified time."

The statutory provision for the joint orders of the State Board of Health and the Committee on Water Pollution which I have mentioned reads as follows: "The State Board of Health, or the State Health Officer acting for the State Board of Health under sec. 144.08 and the Committee on Water Pollution, or its executive officer acting under sec. 144.52 (2), may act jointly as to all matters under Chapter 144 which in any way come within the jurisdiction of either or both of said agencies."

In addition to abatement of water pollution in Wisconsin through the issuance of Board and Committee orders and through enforcement of those orders in the courts where necessary, we have in Wisconsin other means of abating water pollution. I shall now discuss these briefly.

Sec. 29.29 (3), Wis. Stats., provides as follows:

> "No person shall cast, deposit, or throw overboard from any boat, vessel or other craft into any waters within the jurisdiction of the state, or deposit or leave upon the ice thereof until it melts, any fish offal; or throw or deposit, or permit to be thrown or deposited, into any waters within the jurisdiction of the state any lime, tanbark, ship ballast, stone, sand, except where permitted by s. 30.12 (2) (b), slabs, decayed wood, sawdust, saw mill refuse, planing mill shavings, or any acids or chemicals or waste or refuse arising from the manufacture of any article of commerce, or any other substance deleterious to game or fish life other than authorized drainage or sewage from municipalities and industrial or other wastes discharged from mines or commercial or industrial or ore processing plants or operations, through treatment and disposal facilities installed and operated in accordance with plans submitted to and approved by the committee on water pollution

> "under ch. 144, or in compliance with orders of that committee. Any such order shall be subject to modification by subsequent orders."

The penalty for violating this statute is a fine of not more than $100, or imprisonment not less than 30 days nor more than 6 months, or both such fine and imprisonment. That is a misdemeanor in our State. The prosecution under this law is frequently undertaken to secure punishment of offenders who are not engaged in a continuing course of conduct involving water pollution, but who are inclined to attempt occasional or sporadic pollution of waters within the jurisdiction of Wisconsin, in violation of sec. 29.29 (3). Where such an offender is prosecuted under that statute, and fined or imprisoned, or both, it can reasonably be assumed that in most instances he will be discouraged from repeating his offense. Water pollutions of the kind frequently prosecuted under sec. 29.29 (3) and the penalty statute, sec. 29.63, often result in game fish kills, and when such a pollution does bring about a game fish kill the State Conservation Commission -- and now we are getting to a third agency of our State -- under sec. 29.65, Stats., may bring a civil action in the name of the State for the recovery of damages against the offender for the kill. A schedule of damages is set out in sec. 29.65 specifying certain amounts in damages for different kinds of game fish. The amounts range from $10 down to $2. When such a civil action is brought against a water polluter it is a bar to a criminal prosecution in our State for the same offense, and vice versa.

Sect. 146.13 (2), Stats., reads:

> "No person shall discharge by any means whatsoever untreated domestic sewage into any surface water as defined by s. 144.51 (1), or drainage ditch constructed under the provisions of chapters 88 and 89; nor shall any person discharge effluents or pumpage by any means whatsoever from any septic tank, dry well or cesspool into any surface water as defined by s. 144.51 (1) or drainage ditch constructed under the provisions of chapters 88 and 89. Whoever violates this subsection shall be fined not to exceed $50 for the first offense and not less than $50 nor more than $200 or imprisoned 30 days, or both, for each subsequent offense."

This statute was designed to be enforced at the county level by district attorneys. Its penalty is certainly sufficient, I think, in the case of an average offender, to discourage repeated violations once the first violation has been detected and prosecuted. We do not have, I might say, adequate figures or information on which to base a judgment as to how effectively this statute has been used in Wisconsin to obtain abatement of water pollution, but it can be said with certainty that the presence of this law on our books gives every district attorney in Wisconsin a weapon or tool well adapted to use by him in the constant battle that is necessary to wage against water pollution.

Another statute, I might mention, enforceable by district attorneys at the county level is sec. 29.288, reading as follows:

> "Whoever deposits, places or throws into any waters within the jurisdiction of the state, or leaves upon the ice thereof, any cans, bottles, debris, refuse or other solid waste material, shall be fined not more than $100 or imprisoned not more than 30 days, or both."

This statute, like sec. 29.29 (3) already mentioned, is designed to discourage the sporadic or occasional polluter from repeating his offense. The penalties for its violation are a fine of not more than $100, imprisonment not less than 30 days nor more than 6 months, or both such fine and imprisonment. Sec. 29.63 (1) (a), Stats. In addition to such penalties, a violator of such statute may have another penalty imposed on him: the loss of any license issued to him under Ch. 29, Wis. Stats., i.e., any license to hunt, trap, or fish. If such license is revoked as additional penalty for a violation of sec. 29.288, Stats., "no such license shall be issued to such person (the violator) for a period of not to exceed one year thereafter." Sec. 29.63 (3), Stats.

Under Wisconsin law, measures to abate water pollution may also be undertaken at the city, village, county and town levels. City councils, by statute, have the management and control of navigable waters within the city boundaries, and may issue or promulgate ordinances forbidding pollution of such waters. Violations of such ordinances would be prosecuted by the city attorney. Village boards, by statute, have the management and control of navigable waters within villages, and a village board can adopt an ordinance prohibiting pollution of such waters. A violation of such an ordinance would be prosecuted by the village attorney. Counties have the power to adopt sanitary codes, "make necessary rules and regulations in relation thereto and provide for enforcement of such codes, rules and regulations by forfeiture or otherwise." Sec. 59.07 (51). There is no definition in our statutes of the term "sanitary code" as that term is used in sec. 59.07 (51), but in my judgment the term is a broad one, encompassing any ordinances, rules or regulations relating to preservation of the public health.

Consistent with such a construction of the term "sanitary code," it would follow that a Wisconsin county has the power, in adopting a sanitary code, to adopt as a part thereof a provision prohibiting pollution of streams and lakes within the county. It can also adopt enforcement provisions relative to such a prohibition against water pollution, with such provisions providing for forfeitures to be imposed against violators of the anti-pollution provision. And town boards of health (and boards of health of villages and cities also) are authorized under Wisconsin law to make such rules and regulations as shall be most effectual for the preservation of the public health, and such rules and regulations could contain provisions for the prohibition of water pollution and for the enforcement of such provisions.

In connection with water pollution abatement in Wisconsin and the power to accomplish the same, special mention should be made of the Metropolitan Sewerage Commission, which operates in Milwaukee County. This commission might be described as the overlord of the Metropolitan Sewerage District of Milwaukee County, which district, by statute, is a municipal body corporate. Such district is within Milwaukee County but lies outside the limits of the City of Milwaukee. Among its powers, the Metropolitan Sewerage Commission "may require any town, city or village in such county, or any occupant of any premises outside of said city of the first class, located in such county, engaged in discharging sewerage effluent from sewage plants, sewage refuse, factory waste, into any river or canal within such county within the drainage area hereinafter provided for to so change or rebuild any such outlet, drain or sewer as to discharge said sewage, waste or trade waste into the sewers of such city, town or village or into said main sewers by it established and under such regulations as the commission may determine."

It also has the power, "Whenever necessary in order to promote the best results in the construction, operation and maintenance of the systems provided for in this section, and to prevent damage to the same from misuse, *** acting on behalf of the district," to "make, promulgate and enforce such reasonable rules and regulations for the supervision, protection, management and use of said system as it may deem expedient, ***."

In Wisconsin we have special statutes under which abatement of water pollution may be sought where such pollution constitutes a private nuisance or a public nuisance. The term "nuisance" applies to that class of wrongs which arises from the unreasonable, unwarrantable, or unlawful use by a person of his own property and produces such material annoyance, inconvenience, discomfort or hurt that the law will presume a consequent damage. 39 Am. Jur. Nuisances, sec. 2. A public nuisance is one which affects the public at large or of such of the public as may come in contact with it, while a private nuisance affects the individual or a limited number of individuals only. By statute in our State, any person may maintain an action to recover damages for and to abate a private nuisance or any person, county, city, village or town may maintain an action to recover damages or to abate a public nuisance from which injuries peculiar to the complainant are suffered, so far as necessary to protect the complainant's rights and to obtain an injunction to prevent the same. See sec. 280.01, Wis. Stats.

Under another statute, an action to enjoin a public nuisance may be commenced and prosecuted in the name of the State, either by the Attorney General upon his own information, or upon the relation of a private individual, or a county, having first obtained leave therefor from the court. An action to enjoin a public nuisance may also be commenced and prosecuted by a city, village or town in its own name, and it is not necessary to obtain leave of the court to commence or prosecute such an action. How often use has been made of these statutes to obtain abatement of water pollution in Wisconsin I cannot say, but it is my understanding that there has been some limited usage of them for that purpose and that such usage has produced results favorable to public health.

I can't say, frankly, how often resort has been had to these statutes to attain abatement of water pollution. I will say this: That I think there is a strong inclination sometimes on the part of people at the local level -- that is, the village or city or town level or county level -- not to bring an action, let's say for abatement of a public nuisance, and that might involve water pollution. There is a preference, perhaps somewhat understandable, for the State taking action rather than the local people, though, as I say, our Wisconsin statutes afford the local units of government, the municipal corporations and the quasi-municipal corporations, the right to go into court to abate public nuisances.

In closing this comment on Wisconsin law relating to water pollution, we believe it advisable to make one further observation. It is that we are thankful that our State laws give us effective tools to fight pollution of our waters because, among other reasons, we sincerely question the right of the Attorney General of the United States to maintain any action on behalf of the United States for abatement of pollution of interstate waters, under the provisions of sec. 466g.(f)(1) and (2), 33 U.S.C.A. Such an action might be viewed in some quarters as a substitute for State action where the State, for some reason incomprehensible to us, refuses to act. In our judgment, however, reliance on such a substitute must be unwise, very unwise, for the simple reason that the Federal case law raises a very substantial doubt as to the existence of any right in the United States to bring suit to abate pollution in interstate waters merely for the purpose of removing a hazard to the public health and welfare, without any purpose involved in the control of navigation or the regulation of commerce on such waters being subserved thereby. Sec. 466g. (f)(1) and (2), 33 U.S.C.A. reads:

> "(f) If action reasonably calculated to secure abatement of the pollution within the time specified in the notice following the public hearing is not taken, the Secretary--"

Before I go on any further, let me say this: If, as at this particular conference, you have a situation where the State did nothing or the States did nothing and permitted a situation of water pollution, an aggravated one, to continue to exist, the Federal law provides then for a hearing, and at this hearing, of course, the States would be represented. Then, if nothing resulted from the hearing, I believe the law, without going to the statute books, gives a six-months period thereafter for the States to act. If thereafter a State failed to act under certain circumstances -- and they are described here -- then the Federal provisions apply.

I am going to read that language over to you again that I started with:

> "(f) If action reasonably calculated to secure abatement of the pollution within the time specified in the notice following the public hearing is not taken, the Secretary --
>
> "(1) in the case of pollution of waters which is endangering the health or welfare of persons in a State other than that in which the discharge or discharges (causing or contributing to such pollution) originate, may request the Attorney General to bring a suit on behalf of the United

> "States to secure abatement of pollution, and
>
> "(2) in the case of pollution of waters which is endangering the health or welfare of persons only in the State in which the discharge or discharges (causing or contributing to such pollution) originate, may, with the written consent of the Governor of such State, request the Attorney General to bring a suit on behalf of the United States to secure abatement of the pollution."
>
> (Emphasis ours.)

The particular provision we are concerned with is the one which indicates that where you have one State causing pollution in another State, or where you have pollution of water which is endangering the health and welfare of persons in a State other than that in which the discharge is occurring, at this point the Attorney General of the United States can be requested to bring suit, and can bring suit, and this we challenge.

It is obvious that any suit brought by the United States under these statutory provisions would be brought only to abate pollution of interstate waters "endangering the health and welfare" of the described persons. It is conceivable that such pollution might also, incidentally, cause some impediment to navigation or commerce on those waters; but an action brought under these statutes would not be brought to remove such impediment, if it existed, but would be brought only to abate the pollution in question for the purpose of removing it as a threat to public health and welfare. Since this is so -- and we think it is clearly so we question the right of the United States to bring such an action, because the right of the United States in the navigable waters within the several States is clearly limited, even in the more generous view, to purposes of "commerce control." U. S. vs. Appalachian Power Co. (1940), 311 U.S. 377, 426. In a less generous view, cited with approval by a lower Federal court despite the earlier holding of the Appalachian Power Company case above-cited, such right is limited to control of those waters "for purposes of navigation." See United States vs. Twin City Power Co. (1954), 215 F. 2d 592, 597. See also United States vs. Appalachian Power Co. (1939), 107 F. 2d 769, 779, 780. In this same case, the 1954 case, the Court said: "Federal legislation with respect to navigable waters is permissible only when it has some real and substantial relation to the control of navigation." (Emphasis ours.)

You can substitute "commerce" there and I think "commerce" should be substituted. For "navigation" substitute "commerce," in view of the Supreme Court's "more generous" view of Federal power over navigable waters. In the light of these Federal holdings, it seems clear to us that any Federal statute is unconstitutional which vests or seeks to vest in the United States a power to bring suit for the abatement of pollution of interstate streams, for purposes other than the control of commerce thereon. As the Appalachian Power Company case indicates, the control of commerce on navigable waters embraces many things: navigability of those waters, flood protection, watershed development, recovery of the cost of improvement through utilization of power. U. S. vs. Appalachian Power Co. 311 U.S. at p. 426. It is not concededly a narrow term, but neither in this case nor in any other are we able to find any holding that control of commerce on a navigable water involves protection of the health and welfare of certain persons against hazards arising from the pollution of such waters. Nor are we able to find any holding under the "general welfare" clause of the United States Constitution -- Art. 1, Sec. 8, Cl. 1 -- to the effect that such clause, without regard to the so-called "commerce clause" of the same article and section -- would support a law authorizing actions of the type contemplated under sec. 466g. (f) (1) and (2), 33 U.S.C.A.

Thank you, Mr. Chairman. Thank you, ladies and gentlemen.

MR. STEIN: Are there any comments or questions?

(No response.)

MR. STEIN: I have one comment. It was a very illuminating statement, Mr. McDermott, and, of course, it is every American's inalienable right to claim that the statute is unconstitutional, and I will defend that right to the death. However, I do think that the point you have raised has been thoroughly considered by the Congress in enacting this legislation.

The constitutional issue and digest of that can be found in reports from the 1930's. The latest one was in the 1960 amendments.

I might say that many of the provisions of the legislation were hotly contested, particularly, as Mr. Olds will attest to, the enforcement provision. The opponents of this were very vigorous indeed.

Yet, after reviewing the analysis made by the people who looked at the constitutional question, none of them rested the opposition on the fact that this portion of the statute would be unconstitutional.

This statute has been interpreted in large part by many, many attorneys in Washington, including the Department of Justice under the Eisenhower and the Kennedy Administrations. In their view, they thought unanimously that there was no doubt about its constitutionality.

Furthermore, I think this self-same statute with the self-same provision on the Upper Mississippi was invoked by the Governor of Wisconsin, as he had every right to do.

We are going to have a conference in Minneapolis on the Upper Mississippi on January 28, 1964. In asking for this, Governor Reynolds, who has had some small experience in water law himself, since he worked on the Chicago diversion case for many years, recognized that the Government was going to spend $250,000 a year on the Upper Mississippi case.

I doubt whether your experienced governor, who is a lawyer, would have asked the taxpayers to spend that money on an unconstitutional statute.

MR. MC DERMOTT: Well, I would like to say just several words in response to that.

First of all, I gather that you are relying, Mr. Stein, on the fact that the Congress of the United

States evidently thought that when it enacted this bill it was constitutional.

Of course, historically we know that Congress and many State legislatures in the past have often enacted bills in the firm and consoling belief that they were constitutional, only to have the courts say later on that they were not constitutional at all and throw them overboard, as they can under our system of government.

Secondly, I gather that numerous lawyers in Washington, all of them associated with the Federal Government, take the position that this is a constitutional statute.

Now, I am not making a shotgun attack on this law, and we are not doing that in Wisconsin. Our attack -- and it isn't even an attack; it is the raising of a legitimate question -- what we think is a legitimate question -- is confined to one portion of the statute, Mr. Stein. I want to emphasize that and make it decidedly clear.

I might say this: I know of no court decision -- and it is the courts in the long run that are going to determine whether or not this law is constitutional, and not the Congress and not any lawyers in Washington, no matter how eminent their positions may be -- it is the courts who are going to determine this; and, so far as I know, no Federal court, not even -- I won't use the word "lowly" -- not even a district court, which is at the bottom of the Federal judicial heap, has come to the conclusion that this is a constitutional law or that it is unconstitutional.

Isn't it true that this has never been raised and litigated?

MR. STEIN: This question has never been litigated, and a reason for it not being litigated may have been that the people who were interested in a litigation did not think it was worth the money or the effort to litigate a case, where they would go down to ignominious defeat.

Several people considered litigating this question, and they have always thought the better of it.

I think again in the Government -- and, as I pointed out, we don't look for court action, but it is everyone's right -- everyone has the right to raise this issue. We do believe that the Appalachian case cited by you and decided by the Supreme Court covers this rather well.

MR. MC DERMOTT: Well, am I correct in saying that there is only one instance -- this is to my knowledge, and perhaps I am decidedly wrong -- but there is only one instance actually in which the Attorney General of the

United States has brought suit in the Federal courts for abatement of water pollution under this particular statute, at St. Joseph, Missouri? Is that the one?

MR. STEIN: There is one case where we went through the hearing stage. A suit was brought, but several other suits were brought against us before hearings, to restrain hearings and to get an injunction to restrain the hearings. These suits were dismissed. None of them, by the way, Mr. McDermott, got to the point in litigation that you have raised. This issue has not been litigated, although the issue has been brought up frequently.

The point is, and the reason I did cite the position of the Congress and the Department of Justice under the Administration and the opponents of the bill, is that -- I don't know that this is the place to get into a discussion on whether the statute is legal or not. We can do it.

MR. MC DERMOTT: I agree at this point.

MR. STEIN: Again let me say you may have the same rule in Wisconsin which we have in the Federal establishment. In other words, the Attorney General has said time and time again, and I think the precedents for this go back about a hundred years, that once the Congress passes a law we assume that it is constitutional until the court holds otherwise.

MR. MC DERMOTT: That is right. There is a presumption of constitutionality. I will readily concede that, but this is something that the courts, of course, need not be governed by. They can upset that.

MR. STEIN: Yes, sir.

MR. MC DERMOTT: Thank you.

MR. STEIN: Thank you, Mr. McDermott.

MR. MUEGGE: Mr. Chairman, we would now like to introduce Mr. Leonard A. Montie, who is the Director of our Division of Public Sewer Facilities, to cover the facilities and sewage pollution within the Menominee River Basin. That is the Wisconsin part of the basin.

STATEMENT OF LEONARD A. MONTIE, DIRECTOR, DIVISION OF PUBLIC SEWER FACILITIES, STATE OF WISCONSIN

MR. MONTIE: Mr. Chairman, ladies and gentlemen: I would like to begin by a brief review of the activity of the sewerage systems and treatment works in Wisconsin as it relates to domestic sewage. I hope not to duplicate what Mr. McDermott covered, but I will go into some of the portions of the State statutes which are important to us.

History of Sewage Pollution Abatement Program

Wisconsin has been active in the field of sewage treatment from the time when the first municipal plant was constructed in 1894 until the present time, when we have about 400 plants serving public systems as well as numerous smaller treatment works serving institutions and privately owned establishments. The State of Wisconsin had the first trickling filter plant in this country and we had the first heated sludge digestion tank. Much of the pioneering work in development of the activated sludge process was also

L. A. Montie

performed in Wisconsin.

Since sewage disposal has historically been recognized as a health problem, the Wisconsin State Board of Health has been interested in proper handling of sewage since the agency was established. Creation of the Bureau of Sanitary Engineering in 1919 made possible increased efforts as did establishment of district offices and filling district engineer positions in 1936.

We now have district offices of the State Board of Health. Each of these offices has a district engineer who has, among his responsibilities, supervision of operation of sewage treatment plants.

Chapter 144 of the Statutes places responsibility for supervision of sewerage systems with the State Board of Health. Subsection 144.03(1) gives the State Board of Health general supervision and control over waters of the State, water supplies, water systems, sewage and refuse disposal and several other items, which is something Mr. McDermott mentioned. The State Board of Health is authorized by Subsection 144.03(2) to investigate all systems and plants and keep complete records. Subsection 144.03(3) provides that if the Board finds that a system or plant is tending to create a nuisance or menace to health or comfort, it shall order such operating results to be secured as the Board shall prescribe within a specified time. If the Board finds that the absence of a municipal system or plant tends to create a nuisance or menace to health or comfort, it may order a corrective system to be constructed. Section 144.04 provides that construction of a system or plant may not proceed without first having had plans approved by the State Board of Health. The Board is authorized to require connection of the system of one municipality with that of another under Section 144.07. Section 144.09 provides for the keeping of records of plant operation by owners, and the agents of the State Board of Health are allowed to enter the premises of treatment works for the purpose of observing and testing.

Review and approval of plans are carried out by the Section on Sanitary Engineering in the central office. The eight district engineers maintain general supervision over plant operation. During their periodic inspections they advise the operators on correct procedures, desirable improvements, laboratory techniques, maintaining records and other related work. Each plant is required to submit monthly reports of daily operating records to the district office, where they are reviewed by the district engineer and then forwarded to the central office.

In addition to the contacts made by the district engineers, further training of operators is carried on by the State Board of Health in cooperation with other agencies by conducting a short course for sewage works personnel every two years. This course consists of three days of lectures, laboratory sessions and panel discussions. The 1963 short course was attended by 185 operators. Cooperating with the State Board of Health in this program are the University of Wisconsin, the Conference of Wisconsin Sewage Works Operators and the League of Wisconsin Municipalities. In cooperation with these agencies a voluntary program for certification of sewage works operators has been in effect since 1955. There are presently 208 operators certified in one of four grades.

Sewage Treatment Progress

A brief review of the activity of sewer system and treatment works construction in Wisconsin would be of interest at this point. In 1920 a population of 1.2 million persons was served by public sewer systems, with only 17 percent of this population receiving the benefit of sewage treatment. By 1930, 55 percent of the sewered population had treatment service; in 1940 it was 89 percent; in 1950 it was 92 percent. At the present time, we have approximately 2,663,000 persons, which is about two-thirds of the population of the State, served by public sewers, and all but 3,000, in seven communities, receive the benefit of treatment. Plants are under construction or will be under construction shortly to reduce this figure to less than 500.

Menominee River Basin Sewage Treatment Plants

There are only four communities in the Menominee River Basin in Wisconsin which have public sewer systems, all of which have sewage treatment facilities. These are the City of Marinette, Village of Niagara and the unincorporated communities of Florence and Goodman. The Village of Wausaukee is in the process of installing a sewer system and sewage stabilization pond. There have been some problems with operation of private sewage disposal systems in Wausaukee, but there is no record of any sewage reaching a surface watercourse. There are no known instances where sanitary sewage is directed to surface waters in any of the other unincorporated unsewered communities in this drainage basin.

The Village of Niagara, which had a 1960 population of 2,098, has a primary sewage treatment plant which was built as a result of a conference agreement by village, State Board of Health and Committee on Water Pollution and was placed in operation in 1959. The plant processes comprise comminution, separate sedimentation, sludge digestion and sludge drying beds. At the present dry weather sewage flow of about 300,000 gallons, the sedimentation tank has a surface settling rate of 425 gallons per square foot per day. With the present population the combined volume of the two heated sludge digestion tanks is equivalent to 5.25 cubic feet per capita. The plant influent is disinfected by chlorination on a year-round basis. Monthly reports on daily plant operation has been satisfactory. The operator attended the last sewage works operators' short course. It has been determined that an excess volume of clear waters enters the sewer system at times which reduces the effectiveness of the plant. Order No. 2-63J-2, issued by the State Board of Health and Committee on Water Pollution on February 13, 1963, requires that separation of clear water be carried out and that a report of findings and a program for separation be submitted to the State Board of Health for approval on or before July 1, 1964.

The City of Marinette, with a 1960 population of 13,329, has a primary sewage treatment plant with separate sludge digestion facilities. This plant was placed in operation in 1938 with a Public Works Administration Construction grant. Two sedimentation tanks are operated in series, each having a surface settling rate of 1,000 gallons per square foot per day at the present average dry weather sewage flow of approximately 2.0 million gallons per day. The combined volume of the two heated sludge digestion tanks is equivalent to 5.9 cubic feet per capita. Portions of the sewer system are combined which results in a hydraulic overload of the plant at times and bypassing a mixture of storm water and sanitary sewage at times. Order No. 2-54J-15 was issued by the State Board of Health and Committee on Water Pollution on April 6, 1954, requiring that year-round disinfection of effluent be provided and that the city conduct a study and develop a program for separation of storm and sanitary sewers. Chlorine is being applied to the influent of the second basin on a year-round basis in response to this order. The program for separation of storm and sanitary sewers is continuing, a progress report having been submitted on March 29, 1962. Activity in this regard is verified by Exhibit No. C-2. Monthly reports on daily operation of the sewage treatment plant are submitted to the State Board of Health. Plant operation has been satisfactory.

The unincorporated community of Florence provides for treatment of sewage by means of a coarse screen and a stabilization pond, the latter consisting of primary and secondary units with surface areas of 9.0 and 6.6 acres, respectively. The maximum liquid depth in the pond is five feet. This community has a population connected to the sewer system of 750 and industrial wastes from a cheese factory are also connected to the sewer system. The B.O.D. loading of the stabilization pond is about 17 pounds per acre per day. An inadequate pond previously served this community and the present pond was constructed in response to Order No. 2-54J-17 issued by the State Board of Health and Committee on Water Pollution on April 6, 1954. Overloading of the pond with industrial waste occurred when it was placed in operation. However, it appears that whey and similar strong wastes are presently being withheld from the sewer system and the treatment facility is functioning satisfactorily. Effluent is discharged to Weber Creek, a tributary of the Brule River which leads to the Menominee River.

The unincorporated community of Goodman has a sewage treatment plant consisting of a coarse screen, combination primary settling tank and digestion unit, trickling filter, final settling tank, sludge drying beds and chlorine contact chamber. This plant was constructed in 1948 at the time the sewer system was installed by Goodman Lumber Company and is presently operated by Goodman Lumber Division, Calumet and Hecla, Inc. This community has a connected population of approximately 600 with no industrial wastes connected to the system. The trickling filter is loaded at about 20 pounds of B.O.D. per 1,000 cubic feet of media per day on the basis of the present population. The heated digestion tank capacity is equivalent to 4.33 cubic feet per capita. Hydraulic loading of the settling tanks is within acceptable limits. Operation of the plant is satisfactory and monthly reports of daily operation are submitted to the State Board of Health. The operator attended the last sewage works operators' short course and is certified. Plant effluent is discharged to Chemical Creek, which is a trout stream and which is tributary to the Pike River, a branch of the Menominee River.

Thank you. This concludes my report, Mr. Chairman.

MR. STEIN: Are there any questions or comments?

(No response.)

MR. STEIN: Thank you.

MR. MUEGGE: Thank you.

I would now like to call Mr. Ceasar Stravinski, who is the Director of the Public Water Supply Division of the Board. He will discuss the surface water supply at Marinette and the bathing beaches in the area.

MR. STEIN: Before you start, I know people are getting tired. We are just going to go through another portion of this report, which should not be too long, as I see it. It is just a few more pages. It won't take more than about fifteen minutes, so don't despair. We will be through for the day rather shortly.

Thank you.

C. A. STRAVINSKI

STATEMENT BY C. A. STRAVINSKI, DIRECTOR,
DIVISION OF PUBLIC WATER SUPPLIES,
WISCONSIN STATE BOARD OF PUBLIC HEALTH

MR. STRAVINSKI: Mr. Chairman, conferees, ladies and gentlemen:

I will cover surface water supply in this particular drainage basin. The other municipalities within the drainage basin obtain their water from wells.

The water supply system was installed by the Marinette Water Company, a private firm, in 1888. The system consisted of a 1,600-foot intake into Green Bay at a depth of 16 feet, north of the mouth of the Menominee River, a transmission main to a pump station and distribution mains. In 1900, a settling tank and Jewell rapid sand filters were installed. Disinfection with hypochlorites was commenced in 1911 and with liquid chlorine in 1928. The City of Marinette purchased the water supply in 1937. The intake was relaid 30 feet below low water datum across the Menominee River in 1938. In 1940, the intake was extended to terminate 2,200 feet from shore in a water depth of 25 feet and a second intake was installed for emergency use in case of anchor ice formations to a recorded distance of 267 feet from shore and to a depth of 10 feet. In 1947, a lakeshore well and low-lift pumps were installed and in 1949 the filters were repaired and a surface wash system provided. The present filtration plant was placed in operation in 1959. It has a design capacity of 4 MGD, and it comprises mechanical flash mixing, mechanical flocculation, sedimentation basins, of which there are four with a detention period of four hours, rapid sand filtration -- there are five filters -- 18'x16' in plan, rate of flow controls, ground storage and high-lift pumps. Chemicals added are alum, activated carbon, sodium silicofluoride and chlorine. Lime is no longer added. Pre- and post-chlorination is practiced. An average chlorine residual of one p.p.m. is maintained at the plant tap. Laboratory facilities are provided for determining residual chlorine, alkalinity, pH, color and bacteriological tests of raw water quality.

Raw water analyses of coliform counts for the period between March 1955 and August 1963 are shown on Exhibit No. C-1. The results indicate a raw water coliform index well below the accepted values reported by the United States Public Health Service as a desirable maximum concentration.

During the period of 1955-1963, inclusive, 991 samples of the finished water were submitted to the State Laboratory of Hygiene in Madison for bacteriological analysis. Of these, 9 were unsafe. The percentage unsafe is 0.91. This is well below the accepted limits of the Public Health Service.

Bathing Beaches

Known beaches in Wisconsin that could be affected by discharge of sewage and wastes into the Menominee River Basin are named and located as follows:

1. Red Arrow Beach is located on the shore of Green Bay immediately south of the Menominee River entrance to the Bay.

2. Pine Beach is located on Green Bay south of the Red Arrow Beach and within the limits of the City of Marinette.

3. County Park Beach is located on the Bay near the south city limits of Marinette andwithin the city limits.

4. Camp We-Ha-Kee is located approximately seven miles south of Marinette on the shores of Green Bay.

Only a limited number of analyses of water from these beaches are available, primary attention being given to the quality of water at Red Arrow Beach, which presumably would be the one that would be most affected by the discharge of sewage and wastes into Menominee River. Results of analyses performed by the State Laboratory of Hygiene from 1953 to 1960, inclusive, indicate the following coliform indices per 100 ml.

Beach	Number Samples	Maximum	Arithmetic Mean	Minimum
Red Arrow	9	10,000	2,522	100
Pine	4	1,000	775	100
County Park	3	1,000	300	100
Camp We-Ha-Kee	2	100	100	100

Analyses were also made by the water department laboratory at two stations on Red Arrow Beach. Results reported during 1962 as most probable number of coliforms per 100 ml. indicate a maximum number of 11,000 per 100 milliliters, an arithmetic mean number of 2,817, and a minimum number of 93. These reports are undoubtedly influenced by the discharge of untreated sewage during periods of rainfall when by-passing occurs. A joint order on the City of Marinette by the State Board of Health and Committee on Water Pollution requires the gradual correction of the sewer system so as to minimize and reduce periods of by-passing and to eventually eliminate such discharge.

These beaches have been used by people from Marinette and insofar as is known, no detrimental effect upon health has resulted from such usage.

That concludes my report.

(Exhibits C-1 and C-2 are as follows:)

Exhibit No. C-1
Monthly Mean Coliform Densities - Raw Water
Marinette
March 1955 to September 1963

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Max.	Min.	Med.
1955	-	-	245	85	88	50	74	617	1624	1136	172	62	1624	50	130
1956	54	38	39	139	71	-	167	120	49	283	115	289	289	38	115
1957	280	103	210	184	97	127	210	248	94	138	175	173	280	94	174
1958	94	55	48	178	144	121	74	399	316	115	223	225	399	48	132
1959	190	242	91	163	280	85	227	544	418	466	352	347	544	85	261
1960	574	178	120	358	248	265	472	524	1360	1110	937	318	1360	120	415
1961	147	220	117	196	91	256	280	506	790	1316	577	437	1316	91	268
1962	231	379	565	610	408	820	2623	1116	1607	1549	538	347	2623	231	587
1963	39	26	158	700	332	550	1058	1023	-	-	-	-	1058	26	441
Max.	574	379	565	700	408	820	2623	1116	1624	1549	937	437			
Min.	39	26	39	85	71	50	74	120	49	115	115	62			
Med.	168	140	120	184	144	191	227	524	604	788	287	303			

Coliform Densities Reported as Indicated Number Per 100 Ml.

10-15-63

Part C - No. 2

MARINETTE EAGLE-STAR, MARINETTE, WISCONSIN
MONDAY, AUGUST 31, 1959

Sewer Separation Plan Currently In 4th Year

Proposed Master Plan Will Cost More Than $1,000,000; Slate 1960 Project

A master plan for separation of storm water and domestic sewage was drawn up in 1956 for City of Marinette and forwarded to the Wisconsin Board of Health for approval. Estimated cost of the program, based upon 1956 prices, is $1,100,000.

The action came after a public hearing was held before the Wisconsin Water Pollution commission in 1954 and the commission ordered the city to reduce pollution in the Menominee river by disinfecting all sewage leaving the treatment plant by adding substantial amounts of chlorine to the treated sewage before it left the plant, and establishing a master plan for the separation of sewage and storm water to be completed in an orderly program of construction.

During 1956 a storm sewer was constructed on Hall Ave. at a cost of $40,000 and another was finished on Parnell St. at a cost of $3,500. In 1957 the Dunlap Riverside Ave. storm sewer was completed at a cost of $5,000. The year 1958 saw the completion of storm sewers on Cleveland Ave. and Parnell Sts, each at a cost of $10,000. A Daggett St. storm sewer from Shore Drive to Pierce Ave. will be completed this year and the extension of storm drains in the vicinity of Jacobson and Lincoln Sts. will also be finished. Cost of these projects is $36,946.

Each time a separation project is completed, the load is reduced on the sewage treatment plant, the plant's efficiency is increased and the pollution load in the Menominee river is reduced. However many more storm water lines must be built before the flooding of basements will be eliminated through complete separation of sewers.

The laying of major trunk storm water lines has not yet been undertaken, though one segment of the main is to be built in 1960. The trunk lines are costly because of the sewer size and the depth at which the lines must be laid. The cost for trunk drains to be laid on this first project is estimated at $45 per foot.

It is the aim of city officials to pursue this program diligently to avoid being required by the Water Pollution Commission to institute a crash program for this construction. Such a program, which would probably cost in excess of $1,000,000, would handicap the city in financing needed improvements to schools and other city plants.

The present program came about as a result of a law passed in 1932 which required that sewers had to be either the sanitary sewer type or a storm water drain. Combinations of these could no longer be used. Prior to this law, all sewers were of the combination type.

The sewage treatment plant here went into operation in 1938 and all sewage had to be brought into the plant. It soon became evident that there was very little treatment of the sanitary sewage during rain storms because of the volume of water that had to be handled. This resulted in the hearing mentioned above and the city's current construction program.

MR. MUEGGE: Mr. Stravinski --

MR. STRAVINSKI: Yes, sir.

MR. MUEGGE: Wouldn't it have been better if, at the conclusion of the statement on the surface water supply, it said, "Of these, 9 contained the coliform organisms, and the percentage containing coliform organisms is 0.91"?

MR. STRAVINSKI: It is 0.91.

MR. MUEGGE: That would be a better way of wording it than saying it was not safe. It is classified as safe, isn't it?

Do you understand the question?

MR. STRAVINSKI: No.

MR. MUEGGE: The use of "coliforms" instead of saying it is unsafe. Say that 9 samples --

MR. STRAVINSKI: Contain coliform?

MR. MUEGGE: -- contain coliform, and that the percentage of those containing coliform was 0.91 percent.

MR. STRAVINSKI: Right.

MR. MUEGGE: There is one other question. That coliform index you read for the beaches, that was a Felch index?

MR. STRAVINSKI: Yes, it was.

MR. MUEGGE: All right.

MR. STEIN: Are there any other questions of

Mr. Stravinski, or are there any comments?

MR. SCHNEIDER: I would like to ask Mr. Stravinski one question. This is a question of semantics again, I guess.

Just above the paragraph that Mr. Muegge was talking about, it mentions a desirable maximum concentration of coliforms, and I don't know whether this is the right terminology. It doesn't seem correct to me, that there is any desirable maximum.

Was this taken out of context from the Public Health Service drinking water standards, or was this terminology used --

MR. STRAVINSKI: This has to do with the United States Public Health Service publication on the raw water quality and the degree of treatment that should be provided based upon a certain raw water quality.

MR. STEIN: I think again this is a semantics business.

I think one thing which should be indicated is that there should be no implication that the treated water was unsafe or even the water taken in for treatment was unsafe.

Now, what has been put out is a number of 5,000 coliforms, which is considered to be the maximum which you should have at a raw water intake. We know that places do process water with over 5,000.

I think the way the words came out here is that it is desirable to maintain it below 5,000, which is what it means; not that it is desirable to have the maximum. Obviously, the closer you can get to zero, the better off you are.

I have one question of clarification, and I know this deals with a separation of sewage.

In your next to the last paragraph you talk about the City of Marinette requiring the gradual correction of the sewer system so as to minimize periods of by-passing, and so forth.

What do you mean by the "gradual correction"? Do you have any notion as to a time schedule?

MR. STRAVINSKI: This goes back to the report that was given by Mr. Montie, in which it is indicated that the City of Marinette under Order No. --

MR. OEMING: That is on Page C-4.

MR. STRAVINSKI: I am trying to find which one that is here.

MR. STEIN: Yes. As you say, a program for separation is to be submitted on or before 1964.

The question that I have is, do you have any notion as to how long this program is going to take?

MR. STRAVINSKI: No, I don't.

MR. STEIN: Except that it is going to be gradual?

MR. STRAVINSKI: Well, if you will look at the exhibit, the sewage separation plan which is currently in the fourth year, it says here that it is the aim of city officials to pursue this program diligently to avoid being required by the Water Pollution Commission to institute a crash program for this construction.

MR. STEIN: I understand that, but this is a question we have. Is there any notion of a target date when you expect that this will be completed?

For example, we have a program of the same type in the metropolitan area of Washington. We know that program will be completed substantially in 1966. Is there any notion as to how long this separation in Marinette will take?

MR. STRAVINSKI: I have no further knowledge.

MR. WISNIEWSKI: Mr. Chairman, there will be a representative of the City of Marinette here to report on this tomorrow.

MR. STEIN: Thank you.

Well, as you can see, we are probably heading for some very, very interesting discussions tomorrow, when we get the discussion, and I think the groundwork has been laid. These things are always necessary here. I suspect tomorrow a good portion of these discussions will be of a lot more interest possibly to the audience. I don't know how they will be to the people at the head table.

So I would recommend that since you have invested this much time, you might want to come back tomorrow.

At this point, if there are no further questions we will stand recessed until 9:00 o'clock tomorrow morning

Thank you.

(Whereupon, at 5:10 p.m., the conference was adjourned until 9:00 a.m., Thursday, November 7, 1963.)